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MISSOURI.
BUREAU OF LABOR STATISTICS.

ANNUAL REPORT

1889/90, v. 2

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1889/90, v. 2

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BUREAU OF LABOR STATISTICS

MISSOURI

1890

VOL. II.

MINES AND MINERS



JEFFERSON CITY, MO. :
TRIBUNE PRINTING COMPANY, STATE PRINTERS AND BINDERS.
1890.

HD80

.M8

1889/90

REPORT

OF THE

STATE MINE INSPECTOR

OF THE

STATE OF MISSOURI,

FOR THE YEAR ENDING NOVEMBER 5, 1890.



JEFFERSON CITY, MO.:

TRIBUNE PRINTING COMPANY, STATE PRINTERS AND BINDERS.
1890.

Compliments of
C. M. Rodson

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STATE OF MISSOURI,
OFFICE OF STATE MINE INSPECTOR. }

To the Hon. LEE MERIWETHER, Com'r, Jefferson City, Mo.:

SIR—I have the honor herewith to submit to you the fourth annual report of this Department, for the year ending June 30, 1890. In presenting to you this report, it affords me pleasure to be able to state that there has been great improvement in many of the mines during the past year. The coal trade during the year has been dull throughout the State, owing to the open winter. The lead and zinc industries have been much extended, and were never in a more prosperous condition. This report affords special information as to the physical characteristics and mechanical equipments of each mine; methods of mining; statistics of employes; production and value of mineral output; record of accidents and measures to prevent them; opening of new mines; closing of exhausted mines; the number of strikes and their final settlement.

Very respectfully,

C. C. WOODSON,
State Mine Inspector.

REPORT

This report contains statistics of the coal, iron, lead and zinc industries in Missouri, for the year ending June 30, 1890. It is the fourth annual report of this character made for the State, and embraces the details of the character, condition, product and location of each mine reported.

The figures given are as reported by the mine operators themselves and are not the results of estimates or conjecture.

The statistics were obtained by personal visits to mines or from schedules sent the mine operators, and filled and returned by them to this office. Every effort was made to obtain complete and accurate returns from mines of every kind, even strip-pits and small local mines being reported.

There are 49 counties in the State reported as producing minerals. Of these, 31 produce coal, 13 lead and zinc and 5 iron. Both lead and coal are mined in Morgan and Dade counties, but not to a great extent. Iron and lead are both mined in St. Francois county.

TABLE I. SUMMARY OF GENERAL RESULTS OF INVESTIGATIONS IN COAL, LEAD, ZINC AND IRON MINES,

For year ending June 30, 1890, as compared with year ending June 30, 1889.

Year ending June 30.	1889.	1890.	Increase.
No. mines of all kinds.....	471	840	369
Total value of minerals at mines.....	\$7,937,674	\$8,165,865	\$228,191
Total number of employes of all kinds.....		11,562	
Total number of miners.....		7,654	
Total number of other employes.....		3,908	
Total number men killed.....		24	
Total number wives made widows.....		14	
Total number children made fatherless.....		27	
Total number non-fatal accidents.....		38	
Number of employes for each life lost.....		448	

II. SUMMARY OF THE GENERAL RESULTS OF INVESTIGATIONS IN COAL MINES.

For year ending June 30, 1890, as compared with year ending June 30, 1889.

Year ending June 30.	1889.	1890.	Increase.
No. counties in which coal was mined.....	22	31	9
No. of mines inspected and reported.....	171	299	128
No. mines employing more than ten men.....	113	124	11
No. of fans in use.....	27	36	9
No. tons of coal mined.....	2,223,477	2,437,399	213,922
Value of coal at mines.....	\$3,030,414	\$3,234,351	\$203,937
Value per ton at mines.....	\$1.36	\$1.32	*.04
Total number employes in winter.....	7,681	7,698	17
Total number employes in summer.....	4,923	4,905	*18
No. miners in winter.....	6,367	6,259	*108
No. miners in summer.....	3,924	3,876	*48
No. other employes in winter.....	1,314	1,439	125
No. other employes in summer.....	999	1,029	30
No. kegs of powder used.....	47,099	44,754	*2,345
Cost of powder.....	\$111,390	\$102,296	*\$9,094
No. men killed.....	10	10	
No. wives made widows.....		5	
No. children made fatherless.....		9	
No. non-fatal accidents.....	20	28	8
No. tons coal mined for each life lost.....	222,347	243,739	21,392
No. tons mined for each non-fatal accident....	111,173	87,049	*24,124
No. new mines opened.....		21	
No. mines abandoned.....		12	

III. SUMMARY OF GENERAL RESULTS OF INVESTIGATIONS IN LEAD AND ZINC MINES.

For year ending June 30, 1890, as compared with year ending June 30, 1889.

Year ending June 30.	1889.	1890.	Increase.
No. counties in which lead and zinc are mined.....	9	13	4
No. mines in operation.....	296	535	239
No. tons of zinc ore mined.....	82,357.5	100,248.1	17,890.6
No. tons of lead ore mined.....	9,469.5	12,909.2	3,439.7
No. tons of pig lead.....	25,440.5	20,451.4	*4,989.1
Average value of zinc ore per ton at mines...	\$21.44	\$22.51	\$1.07
Average value of lead ore per ton at mines...	44.55	45.49	.94
Average value of pig lead.....	70.84	73.91	3.07
Total value of zinc and lead ore and pig lead at mines.....	3,990,039.00	4,355,519.00	365,480.00
Total number of employes.....		4,672	
Total number of miners.....		2,236	
Other employes.....		2,436	
No. men killed.....	14	13	*1
No. wives made widows.....		8	
No. children made fatherless.....		16	
No. non-fatal accidents.....	28	10	
No. tons of lead and zinc for every life lost...	8,376	10,300	1,924
No. employes for each life lost.....		359	
No. engines in use.....		175	
No. pumps in use.....		227	
No. crushers in use.....		82	
No. rolls in use.....		86	
No. steam jigs in use.....		141	

* Decrease.

IV. SUMMARY OF GENERAL RESULTS OF INVESTIGATIONS IN IRON MINES,

For year ending June 30, 1890, as compared with year ending June 30, 1889.

Year ending June 30,	1889.	1890.	Increase.
Average value per ton at mines.....	\$2 30	\$2 47	17
Total value of product at mines.....	310,239 00	575,995 00	\$265,756 00
No. employes of all kinds.....		589	
No. miners employed.....		351	
No. other employes.....		238	
No. men killed.....	1	1	
No. wives made widows.....		1	
No. children made fatherless.....		2	

* Decrease.

In the 46 counties reported there are 840 mines. The average number of employes employed in and about these 840 mines was 11,562, 7,654 of which were miners. These 11,562 employes produced in the aggregate \$8,165,865 worth of coal, lead, zinc and iron. In producing this amount of wealth there were 24 lives lost, 14 wives made widows and 27 children made fatherless, making an average of one life lost for every 448 employes, or one life lost for every \$340,244 worth of mineral produced. There were 38 non-fatal accidents.

V. TABLE SHOWING TONNAGE AND VALUE OF STATE'S OUTPUT OF COAL, LEAD, ZINC AND IRON, YEAR ENDING JUNE 30, 1890.

	No. of mines	No. of tons mined.	No. tons pig lead	Total value of output.
Coal.....	299	2,437,399	.....	\$3,234,351
Lead.....	535	12,909	20,451	2,098,936
Zinc.....	.....	100,248	.....	2,256,583
Iron.....	6	232,835	.....	575,995
Total.....	840	.....	.....	8,165,865

VI. The following table shows by counties the number of coal mines reporting their output in 1888, 1889 and 1890:

County.	1888.	1889.	1890.	County.	1888.	1889.	1890.
Adair.....	2	4	4	Bates.....	42	31	37
Audrain.....	3	3	10	Boone.....	2	2	22
Barton.....	3	8	20	Caldwell.....	2	2	1

County.	1888.	1889.	1890.	County.	1888.	1889.	1890.
Callaway		6	14	Miller			1
Chariton			2	Monroe			3
Clay			1	Montgomery	1	2	4
Cooper	3	1	3	Morgan		2	1
Dade		6	2	Putnam	1	3	7
Grundy	2	1	1	Ralls			4
Henry	11	17	21	Randolph	8	11	33
Howard			1	Ray	11	11	16
Johnson	12	13	11	Saline		1	4
Lafayette	17	33	39	Schuyler			1
Livingston			2	Shelby			1
Linn	3	2	4	Vernon	8	4	12
Macon	10	8	17	Total	141	171	299

Notwithstanding the mildness of the past winter and the depression in trade occasioned thereby, the coal output has increased as compared with the report of 1889. While it is true that more mines are reported this year than last, these additional mines are for the most part small, many of them being strip-pits, or quarries.

The report of 1889 shows an output from 171 mines of 2,223,477 tons, valued at \$3,030,414. These 171 mines gave employment to 7,681 persons in winter and 4,923 in summer. The present report shows the output from 299 coal mines of all kinds to be 2,437,399 tons, valued at \$3,234,351, or an increase of 203,922 tons, and \$203,937 over the past year. The average value at the mines of the coal product has fallen from \$1.36 to \$1.32 per ton. The number of employes reported this year was 7,698 in winter and 4,905 in summer, a decrease as compared with 1889 of 18 in summer and an increase of 17 in winter; but it was found impossible to obtain the number of employes from many of the small mines reported.

In producing 2,437,399 tons of coal there were used 44,754 kegs of powder (costing \$102,296), or a little more than 54.4 tons mined for every keg used. In some counties, however, little or no powder is used, while in others a great quantity is required.

In Bates county 23,813 kegs were used, or more than one-half the total amount for the State; 671,373 tons of coal were produced, making an average of 28.2 tons per keg. Lafayette county, on the other

hand, produced 329,845 tons of coal, and used only 22 kegs of powder, which, I presume, were used in blasting down roof on roadways, etc., as no powder is used in mining the coal in this county.

The aggregate number of accidents in coal mines reported is more for this year than for 1889, there being two less fatal and six more non-fatal accidents. In 1889 there were 12 fatal accidents reported and 22 non-fatal, or one fatal accident for every 222,347 tons mined, and one non-fatal accident for every 111,173 tons mined. The present report shows 10 fatal accidents and 28 non-fatal, or one life lost for every 243,739 tons, and one non-fatal accident for every 87,049 tons mined, and an average of 630 employes for each life lost. In Illinois there were 42 lives lost in 1889, one for every 263,590 tons of coal mined, or one life lost for every 683 persons employed. In Kentucky one life was lost for every 156,134 tons mined in 1889. The Ohio report of 1889 shows one life lost for every 330,527 tons mined

VII. COMPARATIVE TABLE OF TONNAGE AND VALUE OF OUTPUT
OF COAL MINES FOR 1889 AND 1890.

County.	No. of tons mined.		Value of output.	
	1890.	1889.	1890.	1889.
Adair.....	14,840	16,532	\$24,379	\$27,980
Audrain.....	22,813	22,298	30,117	36,497
Barton.....	65,097	122,664	83,818	153,542
Bates.....	671,373	729,633	713,039	755,278
Boone.....	21,302	9,944	31,172	14,916
Caldwell.....	17,074	26,074	34,660	54,671
Callaway.....	18,355	12,633	30,517	19,677
Chariton.....	120	.....	240	.....
Clay.....	5,036	.....	7,554	.....
Cooper.....	1,594	1,027	3,511	1,640
Dade.....	1,400	2,290	1,960	3,907
Grundy.....	23,593	18,000	48,366	35,000
Henry.....	127,281	210,376	193,221	317,694
Howard.....	4,000	.....	5,600	.....
Johnson.....	13,187	12,803	21,113	21,713
Lafayette.....	329,845	320,448	508,743	536,997
Livingston.....	1,100	.....	2,250	.....
Linn.....	13,403	2,136	21,720	4,272
Macon.....	457,896	223,660	585,925	309,443
Miller.....	87	.....	218	.....
Monroe.....	108	.....	163	.....
Montgomery.....	14,744	10,003	21,595	14,769
Morgan.....	240	496	480	1,240
Putnam.....	91,584	75,877	116,883	107,551
Ralls.....	675	.....	1,020	.....
Randolph.....	245,898	184,609	318,833	272,244
Ray.....	240,462	207,829	387,346	324,740
Saline.....	660	832	1,265	1,872
Schuyler.....	300	.....	375	.....
Shelby.....	40	.....	80	.....
Vernon.....	33,292	13,313	38,188	14,841
Total.....	2,437,399	2,223,477	3,234,351	3,030,414

VIII. TABLE SHOWING CHARACTER, TONNAGE AND VALUE OF

County.	No of mines.....	Kind of power employed.			Kind of opening.			Kind of ventilation.		Mode of working		No. of kegs powder..	Cost of powder.....	
		Steam....	Horse....	Hand....	Shaft....	Slope....	Drift....	Strip....	Furnace..	Fan.....	Long wall			Pillar and room....
Adair.....	4	1	1	2	1	...	3	...	2	...	...	4	360	\$900
Audrain.....	10	1	5	2	7	...	2	...	5	...	3	6	8	19
Barton.....	20	1	6	8	2	2	4	11	2	...	...	8	1,797	2,601
Bates.....	37	10	15	5	6	10	4	16	7	10	...	17	23,813	58,655
Boone.....	22	...	8	8	7	2	6	4	10	...	1	10	373	892
Caldwell.....	1	1	...	...	1	...	...	...	...	1	1	...	...	...
Callaway.....	14	...	5	7	3	6	5	...	13	...	11	3	...	...
Chariton.....	2	...	...	2	1	...	1	...	...	...	...	1	3	7
Clay.....	1	1	...	...	1	...	...	...	...	1	1	...	...	...
Cooper.....	3	1	2	...	3	...	...	...	...	...	...	3	20	50
Dade.....	2	...	1	1	...	1	1	...	...	...	...	2	...	...
Grundy.....	1	1	...	...	1	...	...	...	...	1	1	...	5	11
Henry.....	21	7	8	4	11	2	6	2	15	2	7	13	8,965	8,898
Howard.....	1	...	1	...	1	...	...	...	1	...	1	...	24	60
Johnson.....	11	1	2	7	3	4	4	...	4	...	...	10	203	508
Lafayette.....	39	4	23	11	23	1	15	...	33	4	36	2	22	50
Livingston.....	2	...	2	...	2	...	...	...	2	...	...	2	...	...
Linn.....	4	1	3	...	4	...	...	...	3	1	1	3	...	...
Macon.....	17	10	6	1	9	...	7	...	8	8	1	15	11,510	23,947
Miller.....	1	...	1	...	1	...	...	...	1	...	1	...	...	...
Monroe.....	3	...	...	3	...	...	3	...	...	...	1	...	...	...
Montgomery.....	4	1	1	2	2	...	...	...	4	...	4	...	10	22
Morgan.....	1	...	...	...	...	...	...	...	...	...	...	...	4	7
Putnam.....	7	2	2	2	2	1	3	1	4	...	2	6	...	...
Ralls.....	4	...	...	3	...	...	1	3	...	...	...	...	...	...
Randolph.....	33	7	9	10	12	6	12	1	17	7	5	22	2,585	5,560
Ray.....	16	9	6	1	15	1	...	...	14	1	16	...	...	...
Saline.....	4	...	...	4	...	1	3	...	1	...	...	3	...	...
Schuyler.....	1	...	...	1	...	...	1	...	...	...	...	1	...	...
Shelby.....	1	...	...	1	...	1	...	...	...	...	...	...	...	...
Vernon.....	12	...	5	3	3	2	1	6	2	...	...	6	52	109
Total.....	299	59	112	88	121	42	82	44	148	36	93	137	44,754	102,296

OUTPUT OF COAL MINES IN MISSOURI, YEAR ENDING JUNE 30, 1889.

Shoot coal.....	Mine coal.....	No. of mules.		No. of miners.		No. of other emp's.		Total No. of all employees.		Total number of tons mined.....	Value of output.....	Average value per ton at mine.....		No. accidents.	
		Winter...	Summer..	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..			Value per ton at mine.....		Fatal.....	Non-fatal.
1	3	3	2	59	21	10	7	69	28	14,840	\$24,379	\$1 64	...	...	...
1	7	4	4	97	54	18	14	115	68	22,813	30,117	1 32	...	...	...
...	32	12	166	65	47	15	213	80	65,097	83,818	1 28	...	...	...	...
26	...	177	107	792	334	281	137	1073	471	671,373	713,039	1 06	3	12	...
5	7	3	7	103	46	17	10	120	56	21,302	31,172	1 46	...	1	...
...	1	3	5	55	55	13	13	68	68	17,074	34,660	2 03	1	...	...
...	12	3	2	76	30	8	3	84	33	18,355	30,517	1 66	...	...	...
2	1	...	...	5	...	...	...	5	...	120	240	2 00	...	...	...
...	1	...	...	35	35	6	6	41	41	5,036	7,554	1 50	...	...	...
3	...	...	...	9	5	5	2	14	7	1,594	3,511	2 20	...	...	...
...	2	...	...	16	4	9	2	25	6	1,400	1,960	1 40	...	...	...
...	1	5	4	90	75	10	10	100	85	23,593	48,366	2 05	1	...	...
15	6	20	22	416	332	165	156	581	488	127,281	193,221	1 51	1	1	...
...	1	1	1	6	6	1	1	7	7	4,000	5,600	1 40	...	...	...
2	8	2	2	66	25	2	1	68	26	13,187	21,113	1 60	...	...	...
...	37	32	24	1335	681	181	110	1516	791	329,845	508,743	1 54	1	4	...
...	2	1	1	9	4	3	2	12	6	1,100	2,250	2 04	...	...	...
1	4	2	2	73	55	16	14	89	69	13,403	21,720	1 62	...	2	...
8	7	101	88	981	883	291	274	1272	1157	457,896	585,925	1 27	2	2	...
...	...	...	...	1	1	...	...	1	1	87	218	2 50	...	...	...
...	...	...	...	4	...	...	...	4	...	108	163	1 50	...	...	...
1	3	...	...	49	29	8	8	57	37	14,744	21,595	1 46	...	...	...
...	...	...	...	5	5	...	...	5	5	240	480	2 00	...	...	...
...	6	12	11	340	202	75	65	415	267	91,584	116,883	1 27	...	...	...
...	1	4	...	8	2	...	...	8	2	675	1,020	1 51	...	...	...
24	15	38	25	550	314	124	70	674	384	245,898	318,813	1 29	1	5	...
...	16	20	17	855	594	146	107	1001	701	240,462	387,346	1 61	...	1	...
...	3	...	...	9	2	...	...	9	2	660	1,265	1 91	...	...	...
...	1	...	...	8	...	...	...	8	...	300	375	1 25	...	...	...
...	1	...	...	2	...	1	...	3	...	40	80	2 00	...	...	...
4	2	8	...	39	17	2	2	41	19	33,292	38,188	1 15	...	...	...
93	155	471	334	6259	3876	1439	1029	7698	4905	2,437,399	3,234,351	1 32	10	28	...

Average, 1 fatal accident to 243.739 tons mined.

Average, 1 non-fatal accident to 87,049 tons mined.

CHARACTER, TONNAGE AND VALUE

ADAIR

No. of mine	Kind of power.		Kind of opening.			Depth of shaft in feet.	Kind of ventilation.		Diameter of fan in feet.	Mode of working		Average thickness of veins in feet	Shoot coal.....	Mine coal.....	No. of kegs of powder used during year.....
	Steam.....	Horse	Hand	Shaft.....	Slope.....	Strip.....	Furnace...	Fan		Long wall.	Pillar and room				
1.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	1	3 1/2	.....	1	.....
2.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	1	3 1/2	.....	1	.....
3.....	.....	1	.....	.....	1	.....	.....	.....	.....	.....	1	3 1/2	.....	1	.....
4.....	1	.....	.....	1	.....	.....	CO	1	.....	.....	1	3 1/2	1	.....	360
Total.....	1	1	2	1	3	.....	2	.....	.....	.....	4	.....	1	3	360

AUDRAIN

1.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	3	1	.....	2
2.....	.....	1	.....	1	.....	.....	45	1	.....	.....	1	3	.....	1	.....
3.....	.....	1	.....	1	.....	.....	25	.....	.....	.....	1	2	.....	1	4
4.....	.....	.....	1	1	.....	.....	10	.....	.....	.....	1	3 1/2	.....	1	.....
5.....	.....	1	.....	1	.....	.....	41	1	.....	.....	1	2 1/2	.....	1	1
6.....	.....	.....	1	.....	1	.....	41	.....	.....	.....	1	2 1/2	.....	1	1
7.....	.....	.....	.....	1	.....	.....	.....	1	.....	1	.....	2 1/2	.....	.....	.....
8.....	1	.....	.....	1	.....	.....	65	1	.....	1	.....	2 1/2	.....	1	.....
9.....	.....	1	.....	1	.....	.....	98	1	.....	1	.....	2 1/2	.....	1	.....
10.....	.....	1	.....	.....	1	.....	.....	.....	.....	1	.....	2 1/2	.....	.....	.....
Total	1	5	2	7	2	.....	5	.....	.....	3	6	.....	1	7	8

BARTON

1.....	.....	1	1	.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....	17
2.....	.....	1	.....	1	.....	30	.....	.....	.....	.....	1	2	.....	1	.....
3.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1 1/2	.....	.....	.....
4.....	.....	1	1	.....	.....	1	.....	.....	.....	.....	.....	1 1/2	.....	1	.....
5.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1 1/2	.....	.....	.....
6.....	.....	.....	1	.....	1	.....	1	.....	.....	.....	1	2 1/2	.....	1	.....
7.....	.....	1	1	.....	.....	1	.....	.....	.....	.....	.....	3 1/2	.....	.....	.....
8.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1 1/2	.....	.....	.....
9.....	.....	1	1	.....	.....	1	.....	.....	.....	.....	1	2 1/2	.....	.....	20
10.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	1	2 1/2	.....	.....	.....
11.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	2 1/2	.....	1	.....
12.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1 1/2	.....	.....	4
13.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1 1/2	.....	.....	6
14.....	.....	1	.....	1	.....	.....	.....	.....	.....	1	.....	2 1/2	.....	1	.....
15.....	1	.....	.....	1	.....	40	1	.....	.....	1	.....	3 1/2	.....	1	1,750
16.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	.....	1 1/2	.....	1	.....
17.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1 1/2	.....	.....	.....
18.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1 1/2	.....	.....	.....
19.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1 1/2	.....	.....	.....
20.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	1	2 1/2	.....	.....	.....
Total.....	1	6	8	2	2	41	.....	2	.....	.....	8	.....	.....	7	1,797

OF OUTPUT OF COAL MINES—Continued.

COUNTY.

Cost of powder for year	No. of mules.		No. of miners.		No. of other empl.		Total No. of all employees		Average price paid for mining		No. days active operation in year.....	Total No. of tons mined	Average value at mines per ton.....	Amount received for year's total output....
	Winter....	Summer....	Winter....	Summer....	Winter....	Summer....	Winter....	Summer....	Winter....	Summer....				
.....	.....	.....	5	4	2	.....	7	4	\$1 00	.....	180	800	\$1 50	\$1,200
.....	.....	.....	.....	.....	.....	.....	.....	.....	1 00	.....	.....	180	1 50	270
.....	2	1	30	5	3	2	33	7	1 00	87½	200	5,383	1 50	8,074
\$900	1	1	20	16	5	5	25	21	1 00	87½	290	8,477	1 75	14,835
900	3	2	59	21	10	7	69	28	.....	.....	.....	14,840	1 64	24,379

COUNTY.

5	.....	.....	3	.....	.....	.....	3	.....	80	.....	65	280	1 50	420
.....	.....	.....	5	2	.....	.....	5	2	1 00	.....	.....	170	1 75	297
10	.....	.....	6	1	1	1	7	2	1 25	\$1 25	110	400	2 00	800
.....	1	1	1	1	1	1	2	2	75	.....	100	320	1 50	480
2	1	1	2	2	1	1	3	3	1 20	1 20	.....	40	1 75	70
2	.....	.....	3	.....	.....	.....	3	.....	1 00	.....	.....	52	1 75	91
.....	.....	.....	10	6	3	3	13	9	1 00	1 00	200	3,285	1 50	4,927
.....	2	2	60	40	10	8	70	48	86	86	288	17,846	1 25	22,307
.....	.....	.....	6	2	1	.....	7	2	1 00	1 00	.....	400	1 75	700
.....	.....	.....	1	.....	1	.....	2	.....	.....	.....	.....	20	1 25	25
19	4	4	97	54	18	14	115	68	.....	.....	.....	22,813	1 32	30,117

COUNTY.

34	6	.....	8	.....	2	.....	10	.....	.....	.....	.....	1,400	2 00	2,800
.....	1	.....	5	.....	1	.....	6	.....	75	.....	.....	480	1 50	720
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100	1 50	150
.....	.....	.....	2	.....	1	.....	3	.....	.....	.....	60	320	2 00	640
.....	.....	.....	3	1	.....	.....	3	1	1 25	\$ 125	110	320	2 00	640
.....	.....	.....	3	.....	.....	.....	3	.....	75	.....	.....	178	1 50	267
.....	2	2	1	1	.....	.....	1	1	.....	.....	.....	60	1 66	100
.....	.....	.....	.....	5	.....	.....	5	.....	.....	.....	90	800	1 50	1,200
45	4	.....	4	2	1	.....	5	2	.....	.....	.....	337	2 50	844
.....	.....	.....	1	1	.....	.....	1	1	.....	.....	200	240	1 00	240
.....	.....	.....	2	.....	.....	.....	2	.....	80	80	35	80	1 50	120
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	75	160	2 00	320
13	6	4	3	1	3	.....	6	1	.....	.....	.....	500	2 00	1,000
.....	2	2	40	20	8	5	48	25	75	60	.....	11,090	1 58	17,630
2,500	7	4	85	35	25	10	110	45	1 20	1 07	.....	45,164	1 09	49,670
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	268	1 50	402
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,200	2 00	6,400
.....	4	.....	1	.....	1	.....	2	.....	.....	.....	60	100	2 00	200
.....	.....	.....	6	.....	.....	.....	6	.....	.....	.....	.....	50	2 00	100
.....	.....	.....	2	2	.....	.....	2	2	1 12½	1 12½	.....	250	1 50	375
2,601	32	12	166	65	47	15	213	80	.....	.....	.....	65,097	1 28	83,818

CHARACTER, TONNAGE AND VALUE

BATES

No. of mine.....	Kind of power.			Kind of opening.			Depth of shaft in feet..	Kind of ventilation.		Diameter of fan in feet	Mode of working		Average thickness of veins in feet.....	Shoot coal.....	Mine coal.....	No. of kegs of powder used during year.....
	Steam.....	Horse.....	Hand.....	Shaft.....	Slope.....	Drift.....		Furnace..	Fan.....		Long wall.	Pillar and room.....				
1.....	1				1			1				1	6	1		770
2.....			1			1						3	1			12
3.....	1			1			70		1	15		5	1		3,500	
4.....	1			1			241		1	10		1	5	1	2,500	
5.....						1						5	5			15
6.....			1		1							4	1			30
7.....		1			1			1				5	1		200	
8.....						1						3	1		100	
9.....		1				1						3				10
10.....						1						3			40	
11.....						1							1		20	
12.....						1						3				
13.....						1						3			80	
14.....		1				1						3				
15.....						1						3				
16.....		1			1			1				3	1		204	
17.....		1			1			1				2	1		188	
18.....						1						3	1			10
19.....		1				1						3	1		200	
20.....		1				1						3	1		25	
21.....		1				1						3	1			
22 (a).....	1			1			33		1	10		1	3	1	2,224	
22 (b).....	1			1					1	10		1	3	1	154	
22 (c).....	1			1			20		1	10		1	4	1	1,241	
22 (d).....	1			1			60		1	10		1	3	1	6,498	
22 (e).....	1			1			245		1	15		1	4	1	1,860	
22 (f).....		1			1				1	10		5	1		403	
22 (g).....	1				1				1	8		1	4	1	741	
22 (h).....		1			1			1				3	1		305	
22 (i).....		1			1			1				5	1		102	
22 (j).....	1				1				1	10		1	3	1	2,195	
23.....		1			1			1				4				
24.....		1	1			1						2	1		80	
25.....			1			1						2				
26.....		1				1						3			10	
27.....		1				1						2	1		6	
28.....			1		1							1	1		90	
Total.....	10	15	5	6	10	4	16	7	10			17	26		23,813	

OF OUTPUT OF COAL MINES—Continued.

COUNTY.

Cost of powder for year	No. of mules.		No. of miners.		No. of other empl's		Total No. of all employes.		Av. price paid for mining.		No. days active operation in year	Total No. tons mined.	Average value at mines per ton	Amount received for year's total output
	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..				
\$1,598	3	2	22	17	8	8	30	25	50	50	241	19,241	\$1 30	\$25,061
27	4	....	1	....	2	....	3	....	30	....	90	600	1 25	750
8,750	17	17	75	75	29	29	104	104	50	50	225	75,000	1 19	89,350
6,250	10	10	57	57	26	26	83	83	50	50	225	51,000	1 14	58,200
32	5	....	3	2	....	....	3	2	....	....	....	1,618	1 00	1,618
66	....	....	3	2	....	1	5	3	75	75	240	2,400	1 25	3,000
410	1	....	15	....	4	....	19	....	....	....	90	2,800	95	2,660
200	....	....	2	1	1	1	3	2	....	....	250	2,500	1 00	2,500
25	6	6	5	3	....	....	5	3	....	....	150	1,500	1 12½	1,688
84	10	....	2	1	5	....	7	1	....	....	200	4,000	1 25	5,000
50	....	....	5	....	....	....	5	....	....	....	120	480	1 25	600
....	....	....	....	....	....	....	....	....	....	....	280	2,875	1 25	3,594
160	....	....	....	....	....	....	....	....	....	....	300	6,800	1 25	8,500
....	....	....	....	....	....	....	....	....	....	....	90	2,000	1 25	2,500
....	....	....	....	....	....	....	....	....	....	....	30	80	1 50	120
428	1	1	12	8	3	3	15	11	75	75	170	3,851	1 26	4,890
394	....	....	18	14	3	3	21	17	75	75	120	3,504	1 26	4,432
....	....	....	....	....	....	....	....	....	....	....	....	6,000	1 20	7,200
21	6	6	3	3	....	....	3	3	....	....	150	1,000	1 14½	1,145
430	14	14	5	5	9	9	14	14	....	....	....	4,444	1 12½	5,000
50	20	20	....	....	20	10	20	10	....	....	....	10,000	1 25	12,500
5,560	7	....	116	....	22	....	138	....	51½	....	119	....	....	....
385	1	....	18	....	4	....	22	....	69	....	75	....	....	....
3,102	4	....	40	....	15	....	55	....	69	....	132	....	....	....
16,245	14	....	160	....	42	....	202	....	....	....	214	....	....	....
4,650	3	....	40	....	24	....	64	....	69	....	179	....	....	....
1,007	1	1	7	7	6	6	13	13	69	....	180	429,875	99½	427,342
1,852	4	4	35	35	12	12	47	47	69	....	70	....	....	....
762	4	3	15	10	5	4	20	14	69	69	140	....	....	....
255	3	3	10	10	3	3	13	13	69	69	30	....	....	....
5,487	5	5	75	75	15	15	90	90	69	69	212	....	....	....
....	3	....	35	....	8	....	43	....	95	....	....	34,222	1 12½	38,500
160	8	8	4	4	3	3	7	7	62½	....	180	1,786	1 20	2,143
..	8	....	....	....	....	....	....	....	....	....	50	560	1 25	700
23	14	6	3	1	9	3	12	4	....	....	....	1,737	1 25	2,171
14	....	....	....	....	....	....	....	....	....	....	....	600	1 25	750
184	1	1	6	4	1	1	7	5	60	....	90	900	1 25	1,125
58,655	177	177	792	334	281	137	1073	471	....	....	....	671,373	1 06	713,039

CHARACTER, TONNAGE AND VALUE

BOONE

No. of mine....	Kind of power.	Kind of opening.				Depth of shaft in feet.	Kind of ventilation.		Diameter of fan in feet.	Mode of working.	Average thickness of veins in feet.	Shoot coal....	Mine coal....	No. kegs powder used during year.....
		Hand....	Horse....	Steam....	Strip....		Fan....	Furnace..						
1.....		1									3	1		1
2.....		1									3	1		
3.....		1				29					4	1		
4.....											3			
5.....						36				1	2			
6.....						30					2	1		2
7.....											3			
8.....		1				112					3			200
9.....		1									3			20
10.....		1									3		1	12
11.....											3		1	1
12.....		1				50					3	1		120
13.....		1				28					3			4
14.....											3			
15.....		1				1					3			
16.....											4			
17.....		1									3	1		6
18.....		1				1					4			2
19.....											4			
20.....		1				45					3			
21.....						1					1			
22.....		1				1					4			5
Total.....		8	8	7	2	6	4	10		1	10	5	7	373

CALDWELL

1.....	1			1		300		1	10	1		1		
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CALLAWAY

1.....				1			1			1		2	1	
2.....		1		1			1			1		2	1	
3.....				1			1				1	2	1	
4.....		1					1				1	2	1	
5.....				1		1	1			1	1	2	1	
6.....				1		1	1				1	2	1	
7.....		1		1		40	1			1		2	1	
8.....		1		1			1			1		2	1	
9.....		1				1	1			1		2	1	
10.....				1		1				1		1	1	
11.....		1				55	1			1		2	1	
12.....		1				50	1			1		2	1	
13.....				1			1			1		2	1	
14.....				1		1	1			1		2	1	
Total.....		5	7	3	6	5	13			11	3		12	

OF OUTPUT OF COAL MINES—Continued.

COUNTY.

Cost of powder for year	No. of mules.		No. of miners.		No. of other emp's		Total No. of all employees.		Average price paid for mining		No. days active operation in year	Total No. tons mined.	Average value at mines per ton	Amount received for year's total output...
	Winter...	Summer.	Winter...	Summer...	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..				
\$2			2		2		4		87½		50	300	\$1 25	\$375
			2				2					80	1 25	100
			3				3					60	1 50	90
			2				2					160	1 25	200
			8	4	1	1	9	5	\$1 25	\$1 25		500	2 00	1,000
5			3	2			3	2	1 25	1 25	85	360	2 25	810
												48	1 50	72
500	2	2	28	22	5	5	33	27	87½	87½		11,089	1 50	16,634
45			6	2	2		8	2	1 00	1 00		1,000	1 37½	1,375
30			2	2			2	2	1 00	1 00		480	1 25	600
2		4	4	1		2	4	3			100	800	1 25	1,000
270			20	5	4	1	24	6	81½			4,560	1 37½	6,270
9			2	2	1		3	2	1 00	1 00		180	1 50	270
											90	120	1 50	180
			3				3		82½			280	1 50	420
			2				2					20	1 00	20
13	1	1	4	2			4	2	87½	87½	120	400	1 25	500
												25	1 25	31
4			2				2		87½			120	1 12½	135
			4	2	1	1	5	3	1 00			280	1 25	350
			2		1		3		1 25		30	80	2 50	200
12			4	2			4	2				360	1 50	540
892	3	7	103	46	17	10	120	56	21,302	1 46	31,172

COUNTY.

.....	3	3	55	55	13	13	68	68	1 15	1 07	266	17,074	2 03	34,660
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COUNTY.

.....	2	1	14	2	3	17	2	1 00	1 00	180	4,400	2 00	8,800
.....			4	4		4	4	1 00	1 00	180	910	2 00	1,820
.....			3	1		3	1	1 00	1 00	80	280	1 00	280
.....			2	2	.....		2	2	1 12½	.....	.....	320	1 87½	600
.....			3	2	1	1	4	3	1 00	.....	.....	1,000	1 00	1,000
.....			4	2	.....		4	2	1 00	.....	162	1,050	1 50	1,575
.....			10		1		11		1 00	.....	175	2,600	1 50	3,900
.....			6	3	.....		6	3	1 00	1 00	.....	1,294	1 50	1,942
.....	1	1	1	1	1	.....	2	1	1 06½	1 06½	300	361	1 50	541
.....			4		.....		4		1 12	.....	160	800	2 12½	1,700
.....			12	7	1	1	13	8	1 00	1 00	264	3,684	1 57	5,800
.....			3		.....		3		1 12½	.....	140	600	1 62½	975
.....			6	4	.....		6	4	1 00	1 00	.....	960	1 50	1,440
.....			4	2	1	1	5	3	1 06	1 06	.....	96	1 50	144
.....	3	2	76	30	8	3	84	33	.....	.....	.....	18,355	1 66	30,517

CHARACTER, TONNAGE AND VALUE

CHARITON

No. of mine.	Kind of power.		Kind of opening.			Depth of shaft in feet	Kind of ventilation.		Diameter of fan in feet.	Mode of working.		Average thickness of veins in feet.....	Shoot coal.....	Mine coal.	No. of kegs of powder used during year....
	Steam....	Horse...	Hand.....	Slope.....	Drift.....		Furnace..	Fan		Pillar and room....	Long wall.				
1.....	1	1	1	30	1	2 $\frac{1}{2}$	1	1	3
2.....	1	1	1	1	2 $\frac{1}{2}$	1
Total.....	2	1	1	1	2	1	3

CLAY

1.....	1	1	425	1	20	1	1 $\frac{3}{4}$	1
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COOPER

1.....	1	1	105	1	1 $\frac{1}{8}$	1	10
2.....	1	1	100	1	1	1	10
3.....	1	1	58	1	1
Total.....	1	2	3	3	3	20

DADE

1.....	1	1	1	2 $\frac{1}{8}$	1
2.....	1	1	1	2 $\frac{7}{12}$	1
Total.....	1	1	1	1	2	2

GRUNDY

1.....	1	1	210	1	10	1	1 $\frac{5}{8}$	1	5
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OF OUTPUT OF COAL MINES—Continued.

COUNTY.

Cost of powder for year	No. of mules.		No. of miners.		No. of other empl.		Total No. of all employes.		Average price paid for mining		No. days active operation in year.....	Total No. tons mined.	Average value at mines per ton.....	Amount received for year's total output...
	Summer..	Winter...	Summer..	Winter..	Summer..	Winter..	Summer..	Winter..	Summer..	Winter..				
\$7	3	3	\$1 00	100	\$2 00	\$200
...	2	2	20	2 00	40
7	5	5	120	2 00	240

COUNTY.

.....	35	35	6	6	41	41	1 12	1 12	60	5,036	1 50	7,554
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COUNTY.

25	2	2	1	1	3	3	150	454	2 26	1,026
25	1	1	1	2	1	60	150	200	2 00	400
....	6	3	3	9	3	1 00	1 00	940	2 21	2,085
50	....	....	9	5	5	2	14	7	....	....	....	1,594	2 20	3,511

COUNTY.

.....	....	....	8	2	1	....	9	2	1 00	1 00	250	800	1 40	1,120
.....	....	....	8	2	8	2	16	4	1 00	1 00	80	600	1 40	840
.....	16	4	9	2	25	6	1,400	1 40	1,960

COUNTY.

11	5	4	90	75	10	10	100	85	1 12	1 06	23,593	2 05	48,366
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REPORT OF THE

CHARACTER, TONNAGE AND VALUE

HENRY

No. of mine.....	Kind of power.			Kind of opening.				Depth of shaft in feet.	Kind of ventilation.		Diameter of fan in feet	Mode of working		Average thickness of veins in feet.....	Shoot coal.....	Mine coal.....	No. of kegs of powder used in period.....
	Steam...	Horse....	Hand	Strip.....	Drift.....	Slope.....	Shaft.....		Fan	Furnace..		Long wall	Pillar and room....				
1.....	...	1	1	...	...	...	...	31	1	...	...	1	...	3	1	...	30
2.....	...	1	...	...	...	...	...	31	1	...	...	...	...	1	1	...	10
3.....	1	...	...	...	...	...	...	35	1	...	...	1	...	2	1	1	75
4.....	...	1	...	...	...	...	...	25	1	...	...	1	...	2	1	...	30
5.....	...	...	...	...	...	...	...	...	1	...	...	1	...	3	1	...	70
6.....	...	...	1	...	...	...	...	...	1	...	...	1	...	3	1	...	30
7.....	1	...	...	1	...	...	...	56	1	...	...	1	...	2	...	1	50
8.....	...	...	...	...	1	...	...	...	1	...	...	1	...	3	...	...	75
9.....	1	...	...	1	...	...	...	75	...	1	10	...	1	3	1	...	660
10.....	...	1	...	...	1	...	...	...	...	...	...	...	1	3	1	...	10
11.....	1	...	...	1	...	...	...	50	1	...	...	...	1	3	1	...	800
12.....	...	...	1	...	1	...	...	...	1	...	...	1	...	2	...	...	50
13.....	1	...	...	1	...	...	...	65	...	1	10	...	...	2	1	1,360	...
14.....	...	1	...	1	...	...	...	35	1	...	...	1	...	2	...	1	...
15.....	...	...	1	...	1	...	...	...	...	...	...	1	...	3	1	1	1
16.....	1	...	...	1	...	...	...	50	1	...	...	...	1	1	1	...	309
17.....	1	...	...	...	1	...	...	...	1	...	...	...	1	2	1	...	...
18.....	...	1	...	1	...	...	...	65	1	...	...	...	1	3	1	...	80
19.....	...	1	...	...	...	1	...	...	...	...	...	...	4	1	...	...	30
20.....	...	1	...	1	18	1	1	2	20
21.....	1	1	1	3	1	...	275
Total.....	7	8	4	11	2	6	2	...	15	2	...	7	13	...	15	6	3,965

HOWARD

1.....	...	1	1	1	1	3	24
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JOHNSON

1.....	1	1	1	2	...	1
2.....	1	1	20	1	1	...	1
3.....	1	1	1	2
4.....	1	...	1	1	1	1	...	1
5.....	1	...	1	1	1
6.....	...	1	20	1	1
7.....	1	...	1	1	1	1	...	1
8.....	1	1	76	1	1	1	...	1	...	200
9.....	...	...	...	...	1	...	...	...	...	...	...	1	1	...	1	...	...
10.....	...	1	...	...	1	...	...	...	...	...	...	1	1	...	1	...	3
11.....	...	...	1	...	1	...	...	...	...	...	...	1	1	...	1	...	...
Total.....	1	2	7	3	4	4	...	...	4	...	...	...	10	...	2	8	203

OF OUTPUT OF COAL MINES—Continued.

COUNTY.

Cost of powder for year	No. of mules.		No. of miners.		No. of other empl.		Total No. of all employes.		Av. price paid for mining.		No. days active operation in year.....	Total No. tons mined..	Average value at mines per ton.....	Amount received for year's total output..
	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..						
\$65....	6	7	3	2	5	9	8	\$1 00	87½	300	3,200	\$1 50	\$1,800	
22....		7	2	1	....	8	2	1 00	106	500	1 50	750	
161 3	3	45	45	20	20	65	65	85	85	260	14,155	1 45	20,525	
65....		8	....	1	....	9	9	1 25	....	....	1,000	2 00	2,000
157 1	1	6	3	3	....	9	3	1 00	87½	130	1,050	1 56½	1,643
66....		4	2	1	1	5	3	1 00	90	....	800	1 50	900
167 1	1	32	30	12	10	44	40	87½	87½	288	15,000	1 45	21,750	
169 1	....	9	....	2	....	11	....	....	....	90	2,000	1 50	3,000
1,452 2	1	65	45	12	8	77	53	95	85	240	17,200	1 44	24,900	
25 1	1	5	5	1	1	6	6	70	70	....	350	1 75	612
1,720 2	2	40	40	25	25	65	65	70	70	225	23,750	1 50	35,625	
100....		40	17	10	10	50	27	85	85	87	2,030	1 20	2,437	
3,186 6	5	60	100	40	35	100	135	85	75	235	30,053	1 50	45,079	
..... 1	1	3	1	....	....	3	1	1 00	90	240	480	1 75	840
2....		2	....	....	....	2	....	1 00	....	....	40	1 87½	75
726 2	1	35	24	9	8	44	32	1 05	90	....	4,780	1 95	9,321
.....		6	2	....	....	6	2	1 12½	....	....	800	1 87½	1,500
172....		6	2	2	1	8	3	85	75	80	733	1 50	1,100	
67....		2	2	10	10	12	12	75	75	300	3,000	1 50	4,500	
45....		9	9	2	2	11	11	1 25	1 25	....	960	2 15	2,064
581....		25	....	12	20	37	20	1 00	1 00	....	5,600	1 75	9,800
8,598	20	22	416	332	165	156	581	488	127,281	1 51	193,221	

COUNTY.

60	1	1	6	6	1	1	7	7	80	80	4,000	1 40	5,600
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COUNTY.

.....	6	3	6	3	87½	75	180	595	2 00	1,190
.....	3	3	1 50	80	80	2 25	180
.....	7	2	7	2	75	75	2,000	1 75	3,500
.....	.....	.....	8	4	.....	.....	8	4	1 37½	1 37½	250	1,100	2 12½	2,337
.....	.....	.....	7	6	.....	.....	7	6	1 50	1 37½	250	1,500	1 70	2,550
.....	.....	.....	1	.....	.....	.....	1	.....	.....	.....	60	72	1 75	126
.....	.....	.....	5	.....	.....	.....	5	.....	1 50	1 50	.....	400	2 00	800
500	1	1	20	8	2	1	22	9	62½	62½	156	6,336	1 40	8,870
.....	.....	.....	4	1	.....	.....	4	1	80	80	168	504	1 25	630
8	1	1	2	1	.....	.....	2	1	1 00	1 00	.....	120	1 75	210
.....	.....	.....	3	.....	.....	.....	3	.....	90	.....	120	480	1 50	720
508	2	2	66	25	2	1	68	26	.....	.....	.....	13,187	1 60	21,113

CHARACTER, TONNAGE AND VALUE

LAFAYETTE

No. of mine	Kind of power.			Kind of opening.			Depth of shaft in feet.	Kind of ventilation.		Diameter of fan in feet.	Mode of working.		Average thickness of veins in feet.....	Shoot coal	Mine coal	No. of kegs of powder used during year ..
	Steam ...	Horse ...	Hand.....	Shaft	Slope.....	Drift.....		Furnace..	Fan		Long wall.	Pillar and room....				
1.....			1					1			1		1		1	
2.....		1						1			1		1		1	
3.....		1							1	10	1		1		1	
4.....		1							1	10	1		1		1	
5.....			1					1			1		1		1	
6.....						1		1			1		2		1	
7.....		1			1			1			1		1		1	
8 _a		1			1		20	1			1		1		1	
8 _b		1			1		14	1			1		1		1	
9.....		1			1		18	1			1		1		1	
10.....			1			1		1			1		1		1	
11 _a		1			1		20	1			1		1		1	
11 _b		1			1		37	1			1		1		1	
11 _c	1				1		57	1			1		1		1	
12.....	1				1		70		1	10	1		1		1	
13.....		1			1		70				1		1		1	
14.....		1			1			1			1		1		1	
15.....		1			1		22				1		1		1	
16.....	1				1		100		1	8	1		1		1	
17.....			1			1		1			1		2		1	
18.....		1			1		25	1			1		1		1	
19.....		1			1		42	1				1	1		1	
20.....		1			1		61	1			1		1		1	20
21.....			1			1		1				1	1		1	
22.....		1			1		30	1			1		1		1	
23.....			1			1		1				1	1		1	
24.....		1			1		25	1			1		1		1	
25.....			1			1		1			1		1		1	
26.....		1			1		97	1			1		1		1	
27.....	1				1		40	1			1		1		1	
28.....		1			1		34	1			1		1		1	2
29.....		1			1		80	1			1		1		1	
30.....			1			1		1			1		1		1	
31.....			1			1		1			1		1		1	
32.....			1			1		1				2	1		1	
33.....		1			1		45	1					1		1	
34.....		1			1		45	1			1		1		1	
35.....			1			1		1			1		1		1	
36.....		1			1		45	1			1		1		1	
Total	4	23	11	23	1	15	.....	33	4	.....	36	2	.....	.....	37	22

OF OUTPUT OF COAL MINES—Continued.

COUNTY.

Cost of powder for year.	No. of mules.		No. of miners.		No. of other empl.		Total No. of all employees.		Av. price paid for mining.		No. of days' active operation in year.....	Total No tons mined.	Av. value at mines per ton.....	Amount received for year's total output..
	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..				
.....	5	5	110	100	13	9	123	109	\$1 12½	\$1 00	204	47,781	\$1 46½	\$70,042
.....	5	5	45	40	13	8	58	48	1 00	87½	238	23,835	1 45	34,780
.....	6	6	45	35	14	8	59	43	1 00	87½	195	20,259	1 50	30,422
.....	6	6	60	60	13	8	73	68	1 00	87½	195	25,302	1 50	38,250
.....			70	60	7	5	77	65	1 12½	1 00	199	28,920	1 50	43,605
.....			25	15	4	2	29	17	1 12½	1 00	180	5,940	1 37	8,149
.....			4	1			4	1	1 12½	1 00	150	520	1 75	910
.....			75	35	12	6	87	41	1 12½	87½	250	16,000	1 75	28,000
.....			18	12	3	3	21	15	1 12½	87½	210	5,214	1 75	9,125
.....			18	6	2	1	20	7	1 12½	87½	175	2,000	1 50	3,000
.....			100	25	7	4	107	29	1 12½	87½	...	12,000	1 66	19,944
.....	3	1	75	30	12	5	87	35	1 12½	87½	250	17,408	1 55	27,000
.....			22		4		26		1 12½		114	2,800	1 50	4,200
.....			10	7	2		12	7	1 12½	87½	...	480	2 68	1,000
.....			4	2	1		5	2	1 25	1 00	...	240	2 00	480
.....	5	4	110	70	20	16	130	86	1 00	87½	250	36,000	1 50	54,000
.....			9	3			9	3	1 12½	1 00	300	3,097	1 50	4,646
.....			6				6	4	1 12½		200	1,200	1 50	1,800
.....			13	5	2	1	15	6	1 12½	1 00	211	2,315	1 60	3,706
\$45			30	5	2	1	32	6	1 12½	1 00	160	5,000	1 50	7,500
.....			60	20	1	7	61	27	1 12½	1 00	175	7,000	1 75	12,250
.....			35	5	2	2	37	7	1 25	1 00	...	3,500	1 50	5,250
.....			10	8	1	1	11	9			240	3,400	1 75	5,950
.....	1		12		1		13		1 12½		...	1,000	1 50	1,500
.....			3	3			3	3	1 25	1 00	120	360	2 00	720
.....			20	12	2	2	22	14	1 06½	93½	...	2,482	1 75	4,343
.....	4	2	85	30	17	10	102	40	1 00	87½	170	11,700	1 62½	19,000
.....	5		30		4		34		1 12½	1 00	140	6,200	1 50	9,300
.....			8	7	2	2	10	9	1 25	1 25	...	1,500	1 60	2,400
.....			50		6		56		1 12½	87½	...	3,844	2 00	7,689
.....	2		50	30	5	3	55	33	1 12½	1 00	...	10,930	1 45	15,844
.....			35	20	2	2	37	22	1 12½	1 00	217	7,966	1 40	11,152
.....			10		1		11		1 12½	87½	...	400	2 00	800
.....			25	15	3	2	28	17	1 25	1 00	...	4,918	1 75	8,606
.....			18	4			18	4	1 12½		300	2,084	1 62	3,380
.....			35	12	3	2	38	14	1 12½	1 00	...	6,250	1 60	10,000
50	32	24	1,335	681	181	110	1516	791	.....	.....	.....	329,845	1 54	508,743

CHARACTER, TONNAGE AND VALUE

LINN

No. of kegs of powder used during year....	Mine coal.....	Shoot coal.....	Average thickness of veins in feet.....	Mode of working	Diameter of fan in feet.....	Kind of venti- lation.	Depth of shaft in feet.	Kind of opening.	Kind of power.	No. of mine.....
				Long wall.		Fan Furnace...		Strip..... Drift..... Slope..... Shaft.....	Hand..... Horse..... Steam.....	
1.....	1	....	2	1	....	1	135	1	....	1
2.....	1	....	2 $\frac{1}{2}$	1	....	1	140	1	....	1
3.....	1	....	2 $\frac{1}{2}$	1	....	1	160	1	....	1
4.....	1	....	2 $\frac{3}{8}$	1	12	1	175	1	....	1
Total.....	4	1	....	3	....	3	....	4	3	1

LIVINGSTON

1.....	1	....	1 $\frac{3}{8}$	1	....	1	60	1	....	1
2.....	1	....	1 $\frac{3}{8}$	1	....	1	60	1	....	1
Total.....	2	....	....	2	....	2	....	2	....	2

MACON

1.....	1	....	1	....	130	....	1	3 $\frac{1}{2}$	1	....	3 $\frac{1}{2}$	1	1	360
2.....	1	....	1	....	55	....	1	10	....	1	4 $\frac{1}{2}$	....	1	....
3.....	1	....	1	....	60	....	1	10	....	1	4 $\frac{1}{2}$	....	1	....
4.....	1	....	1	....	55	....	1	12	....	1	4 $\frac{1}{2}$	....	1	....
5.....	1	....	1	....	60	....	1	10	....	1	4	....	1	....
6.....	1	....	1	....	120	....	1	10	....	1	4	1	....	600
7.....	1	....	1	....	120	1	1	10	....	1	4	1	....	1,600
8.....	1	....	1	....	110	....	1	....	....	1	4 $\frac{5}{8}$	....	1	50
9.....	1	....	1	....	75	....	1	6	....	1	4 $\frac{1}{2}$	1	1	....
10.....	....	1	....	....	....	....	....	....	....	....	12 $\frac{3}{8}$	....	....	....
11.....	....	1	....	1	....	1	....	....	....	1	4	1	....	3,744
12.....	....	1	....	1	....	1	....	....	....	1	4	1	....	5,227
13.....	....	1	....	1	....	1	....	....	....	1	4	1	....	27
14.....	....	1	....	1	....	1	....	....	....	1	4	....	....	....
15.....	....	1	....	1	....	1	....	....	....	1	4	....	....	....
16.....	....	1	....	1	....	1	....	....	....	1	4	....	....	....
17.....	1	....	1	....	1	....	1	....	....	1	4	1	....	2
Total.....	10	6	1	9	7	8	8	1	15	8	7	11,510

OF OUTPUT OF COAL MINES—Continued.

COUNTY.

Cost of powder for year.	No. of mules.		No. of miners.		No. of other empl.		Total No. of all employes.		Average price paid for mining.		No. of days active operation in year.....	Total No. tons mined..	A. V. value at mines per ton.....	Amount received for year's total output....
	Winter...	Summer...	Winter...	Summer...	Winter...	Summer...	Winter...	Summer...	Winter...	Summer...				
.....	.....	.....	8	...	2	....	10	....	\$1 25	.....	165	1,800	\$1 75	\$3,150
.....	.....	.....	6	3	1	1	7	4	1 25	\$1 25	145	988	2 00	1,976
.....	.....	.....	9	2	1	1	10	3	1 25	1 25	200	1,200	2 00	2,400
.....	2	2	50	50	12	12	62	62	1 12½	1 12½	.....	9,415	1 50	14,194
.....	2	2	73	55	16	14	89	69	.....	.....	.....	13,403	1 62	21,720

COUNTY.

.....	.....	.....	5	3	2	1	7	4	1 25	1 00	200	1,000	2 00	2,000
.....	1	1	4	1	1	1	5	2	1 25	1 00	.....	100	2 50	250
.....	1	1	9	4	3	2	12	6	.....	.....	.....	1,100	2 04	2,250

COUNTY.

800	6	4	125	85	25	20	150	105	74	60	266	36,000	1 38	50,000
.....	10	6	100	75	40	25	140	100	60	50	250	55,000	1 23	67,684
.....	10	6	75	50	20	12	95	62	60	50	200	15,000	1 33	20,073
.....	20	16	75	40	75	50	150	90	60	50	200	55,000	1 30	71,586
.....	10	6	75	50	10	6	85	56	60	50	243	34,055	1 25	42,569
1,590	.....	5	.....	70	.....	30	.....	100	.....	50	105	13,059	1 35	17,630
3,975	10	8	88	80	38	36	126	116	60	50	238	37,056	1 33	49,538
132	.....	2	.....	30	.....	12	.....	42	.....	50	90	2,120	1 35	2,862
.....	8	8	100	60	18	18	118	78	60	50	.....	29,940	1 34	40,374
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100	1 50	150
6,926	6	6	70	70	15	15	85	85	75	75	268	58,109	1 28	74,764
9,670	9	9	164	164	24	24	188	188	75	75	212	81,139	1 24	101,129
50	2	2	22	22	5	5	27	27	75	75	.....	431	1 26	545
.....	3	3	28	28	6	6	34	34	75	75	.....	8,003	1 15	9,203
.....	2	2	14	14	3	3	17	17	75	75	.....	23,097	1 15	26,561
.....	3	3	30	30	8	8	38	38	75	75	.....	9,766	1 15	11,230
.....	4	2	15	15	4	4	19	10	50	50	.....	21	1 30	27
23,947	101	88	981	883	291	274	1272	1157	.....	.....	.....	457,896	1 27	585,925

CHARACTER, TONNAGE AND VALUE

MILLER

No. of mine.....	Kind of power.			Kind of opening.			Depth of shaft in feet..	Kind of ventilation.		Diameter of fan in feet	Mode of working	Average thickness of veins in feet.....	Shoot coal.....	Mine coal.....	No. of kegs of powder used during year.....
	Steam....	Horse....	Hand....	Strip....	Drift....	Slope....		Fan.....	Furnace..						
1.....	1	....	1	....	....	....	1	....	....	1	7	....	....	....

MONROE

1.....	....	....	1	....	....	1	....	....	....	....	1	2 $\frac{1}{2}$	....	....	....
2.....	....	....	1	....	....	1	....	....	....	....	....	2	....	....	....
3.....	....	....	1	....	....	1	....	....	....	....	....	2	....	....	....
Total.....	....	....	3	....	....	3	....	....	....	....	1	....	....	....	....

MONTGOMERY

1.....	1	....	....	1	....	101 $\frac{1}{2}$	1	....	....	....	1	2 $\frac{1}{2}$	....	1	....
2.....	....	1	....	1	....	40	1	....	....	....	1	2 $\frac{1}{2}$	1	....	10
3.....	....	....	1	....	1	....	1	....	....	....	1	2 $\frac{1}{2}$	....	1	....
4.....	....	....	1	....	1	....	1	....	....	....	1	2	....	1	....
Total.....	1	1	2	2	2	....	4	....	....	....	4	....	1	3	10

MORGAN

1.....	4
--------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	---

PUTNAM

1.....	....	1	....	1	....	25	1	....	....	....	1	3	....	1	....
2.....	....	1	....	1	....	....	....	....	....	....	1	3	....	1	....
3.....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....
4.....	....	1	....	1	....	38	1	....	....	....	1	3	....	1	....
5.....	....	....	1	....	1	....	....	....	....	....	1	3	....	1	....
6.....	1	....	....	....	1	....	1	....	....	....	1	2 $\frac{1}{2}$	....	1	....
7.....	1	....	....	....	1	....	1	....	....	....	1	2 $\frac{1}{2}$	....	1	....
Total.....	2	2	2	2	1	3	1	....	4	....	2	6	....	6	....

OF OUTPUT OF COAL MINES—Continued.

COUNTY.

Cost of powder for year	No. of mules.		No. of miners.		No. of other empl's		Total No. of all employees.		Av. price paid for mining.		No. days active operation in year.....	Total No. tons mined.	Average value at mines per ton.....	Amount received for year's total output...
	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..				
.....	1	1	.....	.....	1	1	.....	.....	.....	87	\$2 50	\$218

COUNTY.

.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	12	1 58	19
.....	.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....	40	1 50	60
.....	.....	.....	3	.....	.....	.....	3	.....	1 20	.....	.....	56	1 50	84
.....	.....	.....	4	.....	.....	.....	4	.....	.....	.....	.....	108	1 50	163

COUNTY.

.....	.....	.....	40	25	7	7	47	32	86	86	190	13,050	1 46	19,100
22	.....	.....	6	2	1	1	7	3	1 00	1 00	250	1,420	1 50	2,130
.....	.....	.....	2	2	.....	.....	2	2	1 00	.....	91	184	1 25	230
.....	.....	.....	1	.....	.....	.....	1	.....	1 00	.....	90	90	1 50	135
22	.....	.....	49	29	8	8	57	37	.....	.....	.....	14,744	1 46	21,595

COUNTY.

7	5	5	5	5	240	2 00	480
---	-------	-------	---	---	-------	-------	---	---	-------	-------	-------	-----	------	-----

COUNTY.

.....	.....	.....	6	2	1	1	7	3	75	75	208	550	1 25	687
.....	.....	.....	1	.....	.....	.....	1	.....	.....	.....	36	73	1 00	72
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14	75	10
.....	.....	.....	6	.....	1	.....	7	.....	87	.....	.....	1,000	1 25	1,250
.....	.....	.....	2	.....	.....	.....	2	.....	.....	.....	.....	32	1 25	40
.....	4	4	100	75	16	14	116	89	88	70	115	15,491	1 38	21,442
.....	8	7	225	125	57	50	282	175	88	70	218	74,425	1 25	93,382
.....	12	11	340	202	75	65	415	267	.....	.....	.....	91,584	1 27	116,883

CHARACTER, TONNAGE AND VALUE

BALLS

No. of mine.....	Kind of power.			Kind of opening.			Depth of shaft in feet.	Kind of ventilation.		Diameter of fan in feet.....	Mode of working	Average thickness of veins in feet.....	Shoot coal.....	Mine coal.....	No. of kegs of powder used during year....
	Steam....	Horse....	Hand....	Strip.....	Drift.....	Slope.....		Fan.....	Furnace...						
1.....							1					21			
2.....							1					22			
3.....							1					21			
4.....			1										1		
Total.....			3			1	3						1		

RANDOLPH

1.....		1		1			88	1			1	32	1		108
2.....		1		1			108	1			1	1	1		60
3.....			1		1			1			1	3	1		4
4.....			1		1			1			1	1	1		100
5.....			1		1			1			1	1	1	1	91
6.....	1			1			70	1	1	10	1	4	1	1	150
7.....	1			1			95	1			1	4	1	1	120
8.....	1			1			100	1	1	12	1	3	1		682
9.....					1			1			1	4	1		96
10.....	1			1			145	1	1	6	1	4		1	
11.....	1			1			175	1	1	10	1	3		1	
12.....		1		1			50	1			1	4	1		15
13.....	1			1			80	1	1	10	1	4	1		700
14.....		1			1			1			1	4	1		
15.....		1		1			90	1			1	4	1		15
16.....		1			1			1			1	4	1	1	18
17.....			1		1						1	1			
18.....			1		1			1	1		1	4	1	1	6
19.....					1			1			1	4	1	1	4
20.....					1						1	4	1	1	12
21.....			1		1						1	4	1	1	
22.....			1		1			1			1	1	1		36
23.....			1		1						1	3	1		5
24.....			1		1			1			1	4	1	1	8
25.....		1			1			1			1	4	1	1	68
26.....		1		1			96	1			1	3	1		
27.....					1						1	1	1	1	
28.....			1		1						1	3	1	1	247
29.....	1			1			110	1	1	12	1	3	1	1	40
30.....		1			1			1			1	3	1	1	
31.....					1						1	1	1	1	
32.....					1			1			1	4	1	1	
33.....												2			
Total.....	7	9	10	12	6	12	1	17	7		5	22	24	15	2,585

OUTPUT OF COAL MINES IN MISSOURI, YEAR ENDING JUNE 30, 1889.

COUNTY.

Cost of powder for year	No. of mules.		No. of miners.		No. of other emp'ys		Total No. of all employes.		Average price paid for mining		No. days active operation in year	Total No. tons mined.	Average value at mines per ton.	Amount received for year's total output.
	Winter...	Summer...	Winter...	Summer...	Winter...	Summer...	Winter...	Summer...	Winter...	Summer...				
.....	4	.....	4	.....	.....	.....	4	.....	50	.....	90	200	\$1 20	\$240
.....	.....	.....	2	.....	.....	.....	2	.....	.....	.....	.....	350	1 60	560
.....	.....	.....	2	2	.....	.....	2	2	.....	.....	.....	100	1 75	175
.....	.....	.....	2	.....	.....	.....	2	.....	.....	.....	.....	25	1 80	45
.....	4	.....	8	2	.....	.....	8	2	.....	.....	.....	675	1 51	1,020

COUNTY.

261	.....	.....	8	4	2	2	10	6	82½	82½	.....	768	1 25	960
150	.....	.....	8	3	2	1	10	4	82½	82½	.....	1,800	1 25	2,250
10	.....	.....	.....	2	.....	.....	.....	2	.....	.....	.....	100	1 00	100
225	.....	.....	8	3	.....	.....	8	3	82½	82½	.....	1,200	1 12½	1,350
204	.....	.....	8	3	3	1	11	4	82½	82½	.....	1,449	1 18	1,720
288	5	.....	50	.....	15	1	65	1	75	.....	130	11,370	1 24	14,125
240	2	2	15	.....	3	.....	18	.....	.....	.....	144	5,800	1 25	7,270
1,398	6	3	70	40	14	7	84	47	60	60	261	17,760	1 23	21,928
240	1	1	4	2	1	1	5	3	70	70	174	1,935	1 35	2,618
.....	7	7	100	100	20	20	120	120	94	94	210	48,000	1 50	72,000
.....	3	.....	67	.....	20	.....	87	.....	80	.....	239	32,500	1 31	42,600
37	.....	.....	4	4	.....	.....	4	4	.....	.....	125	760	1 50	1,140
1,400	3	2	80	60	8	6	88	66	60	50	260	50,000	1 10	55,000
.....	1	1	9	2	1	1	10	3	75	70	263	3,900	1 25	4,871
37	1	.....	3	.....	2	.....	5	.....	85	.....	.....	508	1 25	635
40	1	1	5	3	.....	.....	5	3	70	70	.....	700	1 20	840
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	44	1 25	55
13	.....	.....	2	.....	1	.....	3	.....	.....	.....	100	250	1 20	300
.....	1	1	5	2	1	.....	6	2	70	70	.....	890	1 25	1,112
8	.....	.....	3	1	1	.....	4	1	80	.....	200	900	1 25	1,125
27	.....	.....	2	.....	.....	.....	2	.....	.....	.....	.....	100	1 50	150
.....	.....	.....	2	.....	.....	.....	2	.....	1 00	.....	10	40	1 25	50
80	.....	.....	1	1	1	1	2	2	88½	88½	.....	1,500	1 00	1,500
12	.....	.....	2	.....	.....	.....	2	.....	.....	.....	.....	80	1 00	80
20	1	1	1	.....	.....	.....	1	.....	1 00	.....	200	350	1 50	525
153	.....	.....	6	3	1	1	7	4	82½	82½	180	1,800	1 36	2,458
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19,630	1 25	24,537
.....	.....	.....	3	.....	.....	.....	3	.....	80	.....	.....	400	1 25	500
617	4	4	80	80	27	27	107	107	94	94	192	33,648	1 40	47,107
100	1	1	4	1	1	1	5	2	75	75	.....	461	1 30	600
.....	1	1	.....	.....	.....	.....	.....	.....	75	70	.....	40	1 25	50
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,875	1 30	8,937
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	340	1 00	340
5,560	38	25	550	314	124	70	674	384	.....	.....	.....	245,898	1 29	318,833

REPORT OF THE

CHARACTER, TONNAGE AND VALUE

RAY

No. of mine	Kind of power.			Kind of opening.			Depth of shaft in feet.	Kind of ventilation.		Diameter of fan in feet.	Mode of working.		Average thickness of veins in feet.....	Shoot coal	Mine coal	No. of kegs of powder used during year ..
	Steam	Horse	Hand.....	Shaft	Slope.....	Drift.....		Furnace ..	Fan		Long wall.	Pillar and room....				
1 (a)	1	...	...	1	...	...	55	1	...	...	1	...	1	...	1	...
1 (b)	1	...	...	1	...	...	75	1	...	...	1	...	1	...	1	...
1 (c)	1	...	...	1	...	...	50	1	...	...	1	...	1	...	1	...
1 (d)	1	...	...	1	...	...	55	1	...	...	1	...	1	...	1	...
1 (e)	1	...	...	1	...	...	57	1	...	...	1	...	1	...	1	...
1 (f) .....	...	1	...	1	...	...	...	1	...	...	1	...	1	...	1	...
2 .....	...	...	1	...	...	1	...	1	...	...	1	...	1	...	1	...
3 .....	...	1	...	1	...	...	60	1	...	...	1	...	2	...	1	...
4 .....	...	1	...	1	...	...	100	1	...	...	1	...	1	...	1	...
5 .....	...	1	...	1	...	...	75	1	...	...	1	...	2	...	1	...
6	1	...	...	1	...	...	115	...	...	...	1	...	2	...	1	...
7	1	...	...	1	...	...	100	1	...	...	1	...	2	...	1	...
8 .....	...	1	...	1	...	...	95	1	...	...	1	...	1	...	1	...
9 .....	...	1	...	1	...	...	36	1	...	...	1	...	1	...	1	...
10	1	...	...	1	...	...	42	1	...	...	1	...	1	...	1	...
11	1	...	...	1	...	...	62	...	1	12	1	...	1	...	1	...
Total.....	9	6	1	15	...	1	...	14	1	...	16	16	...

SALINE

1	1	...	1	1	2	...	1	...
2	1	...	1	1	1	1	...	1	...
3	1	...	1	1
4	1	...	1	1	1	...	1	...
Total.....	4	...	3	1	3	3	...

SCHUYLER

1	1	...	1	1	3½	1	...
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OF OUTPUT OF COAL MINES—Continued.

COUNTY.

Cost of powder for year	No. of mules.		No. of miners.		No. of other empl.		Total No. of all employees.		Av. price paid for mining.		No. days active operation in year.....	Total No. tons mined..	Average value at mines per ton.....	Amount received for year's total output..
	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..				
.....	1	1	70	60	14	10	84	70	1 00	1 00	200	145,354	\$1 64	239,709
.....	2	2	90	85	16	14	106	99						
.....	2	2	100	90	16	14	116	104						
.....	1	1	75	60	12	10	87	70						
.....	1	1	50	40	10	8	60	48	1 00	1 00	256	9,030	1 58	\$14,270
.....	2	2	40	15	7	4	47	19						
.....	2	2	45	12	8	3	53	15						
.....	.....	.....	6	3	3	1	9	4						
.....	.....	.....	35	35	6	6	41	41	1 00	1 00	.....	1,400	1 75	2,450
.....	.....	.....	8	2	2	1	10	3	1 00	1 00	.....	11,066	1 37	15,215
.....	.....	.....	.....	.....	.....	.....	.....	.....	1 00	1 00	180	1,228	2 24	2,753
.....	3	2	100	60	12	6	112	66	1 00	1 00	.....	20,000	1 50	30,000
.....	2	.....	70	.....	5	.....	75	.....	1 00	1 00	.....	2,000	1 50	3,000
.....	.....	.....	30	20	5	3	35	23	1 00	1 00	300	15,000	1 50	22,500
.....	.....	.....	6	2	1	1	7	3	1 12½	1 12½	.....	1,344	1 00	1,344
.....	.....	.....	50	30	5	2	55	32	1 00	1 00	.....	2,640	1 50	4,000
.....	6	6	80	80	24	24	104	104	1 00	1 00	181	31,400	1 65	52,105
.....	20	17	855	594	146	107	1001	701	.....	.....	.....	240,462	1 61	387,346

COUNTY.

.....	.....	.....	2	.....	.....	2	.....	1 25	.....	.....	.....	40	1 50	60
.....	.....	.....	4	2	.....	4	2	1 50	.....	.....	.....	480	2 00	960
.....	1	1	1 25	40	1 75	70
.....	2	2	1 00	100	100	1 75	175
.....	9	2	9	2	660	1 91	1,265

COUNTY.

.....	8	8	1 00	300	1 25	375
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REPORT OF THE

CHARACTER, TONNAGE AND VALUE

SHELBY

No. of mine.....	Kind of power.			Kind of opening.			Depth of shaft in feet.	Kind of ventilation.		Diameter of fan in feet	Mode of working		Average thickness of veins in feet.....	Shoot coal.....	Mine coal.....	No. of kegs of powder used in period.....
	Steam....	Horse....	Hand....	Shaft....	Slope....	Writ....		Furnace..	Fan.....		Long wall	Pillar and room....				
1.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	2½	1	.....	.....

VERNON

1.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	4	1	.....	.....
2.....	.....	1	.....	1	.....	30	.....	1	.....	.....	.....	1	2½	1	.....	.....
3.....	.....	1	.....	1	.....	1	.....	.....	.....	.....	.....	1	2½	.....	1	.....
4.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	4	.....	.....	.....
5.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	.....	1	2½	.....	1	.....
6.....	.....	1	1	.....	1	.....	.....	.....	.....	.....	.....	1	2	.....	.....	.....
7.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	5	1	.....	25
8.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
9.....	.....	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	4½	.....	.....	.....
10.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	1	.....	27
11.....	.....	1	.....	1	.....	35	.....	1	.....	.....	.....	1	2½	.....	.....	.....
12.....	.....	1	.....	1	.....	16	.....	.....	.....	4	.....	1	2½	.....	.....	.....
Total.....	.....	5	3	3	2	1	6	.....	2	.....	.....	6	.....	4	2	52

OF OUTPUT OF COAL MINES—Continued.

COUNTY.

Cost of powder for year	No. of mules.		No. of miners.		No. of other empl.		Total No. of all employes.		Average price paid for mining		No. days active operation in year.....	Total No. tons mined.	Average value at mines per ton.....	Amount received for year's total output...
	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..	Winter...	Summer..				
.....	2	.....	1	.....	3	.....	1 00	.....	.....	40	\$2 00	\$80

COUNTY.

.....	.....	.....	15	5	1	1	16	6	1 00	1 00	280	3,037	1 25	3,796
.....	.....	.....	5	.....	.....	.....	5	.....	1 00	1 00	.....	3,000	1 50	4,500
.....	.....	.....	4	.....	.....	.....	4	.....	90	.....	.....	400	1 75	700
.....	.....	.....	2	1	.....	.....	2	1	1 00	.....	.....	400	1 50	600
.....	.....	.....	3	.....	.....	.....	3	.....	1 00	.....	.....	260	1 75	455
53	.....	.....	.....	.....	.....	.....	.....	.....	1 00	.....	.....	165	1 80	298
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,920	1 18	2,280
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,000	1 00	6,000
56	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11,800	1 00	11,800
.....	.....	.....	6	8	1	1	7	9	75	.....	.....	5,796	1 25	7,245
.....	.....	.....	4	3	.....	.....	4	3	87½	.....	.....	500	1 00	500
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14	1 00	14
109	8	.....	39	17	2	2	41	19	.....	.....	.....	33,262	1 15	38,188

LEAD AND ZINC.

This report shows 13 counties in which lead and zinc have been mined during the past year. In some cases it was impossible to obtain the total number of employes and shafts in operation, for the reason that the ore was mined by so many different parties and in such small quantities that it was thought advisable to obtain the total output and its value from the ore-buyers, who were unable to give either the number of men employed or the number of shafts in operation.

The report of 1889 shows an output of 9,469.3 tons of lead ore and 25,440.2 tons of pig lead and 82,357.2 tons of zinc ore. The average value of lead ore was \$44.55 per ton and zinc \$21.44 per ton. Total value of lead and zinc (including pig lead) was \$3,990,039.

The present report shows an output of 12,909.2 tons of lead ore, 20,451.4 tons of pig lead and 100,248.1 tons of zinc ore, making an increase of 3,439.9 tons of lead ore and a decrease of 4,988.8 tons in pig lead (this decrease occurred in the southeastern part of the State), and an increase of 17,890.9 tons of zinc.

The average value of lead ore per ton is \$45.49, an increase of .94 per ton. The average value of zinc ore has also advanced from \$21.44 to \$25.51 per ton, an increase of \$1.07 per ton. The total value of lead ore at the mines (including pig lead) is \$2,098,936, a decrease in value of \$125,198. The value of zinc ore is \$2,256,583, an increase of \$490,678. Jasper and Lawrence counties have shown a large increase in output during the past year.

In the report of 1889 the value of lead and zinc from Jasper county was \$1,650,513. The output for the present year is valued at \$2,152,602, an increase of \$502,089, or 36 per cent, which does not include the output from the Sherwood mine nor Mr. Pat Murphy's mines. These mines on the Murphy land are of great importance, and should have been reported, but we have been unable to obtain a report from them, although every effort was made to induce Mr. Murphy to furnish the desired information.

By a glance at table IX it will be seen that the value of the output from Jasper county nearly equals the output from all the other counties combined.

The aggregate number of accidents in lead and zinc mines is less for the year than for 1889, there being 1 less fatal and 18 less non-fatal accidents. In 1889 there were 14 fatal accidents and 28 non-fatal, or one fatal accident for every 8,376 tons of lead and zinc mined.

The present report shows 13 fatal accidents, or one for every 10,300 tons of lead and zinc mined, or one life lost for every 359 employes.

In Jasper county the number of fatal accidents was 10, or 1 to every 8,130 tons of lead and zinc, while in all the remaining counties there were only 3, or 1 for every 14,102 tons of lead and zinc mined. The excess of fatalities in Jasper county is attributed to the character of ground in which the mining is done, the lack of system in mining, and frequently to carelessness on the part of the miners themselves.

IX. COMPARATIVE TABLE OF TONNAGE AND VALUE OF OUTPUT OF LEAD AND ZINC MINES for 1889 and 1890.

Name of county.	Number of tons mined.				Total value of output of lead and zinc.	
	Lead.		Zinc.		1890.	1889.
	1890.	1889.	1890.	1889.		
Barry.....			30.0	180.0	\$600	\$2,340
Christiau.....	30.0		100.0		2,800	
Dade.....		55.0	1,647.3	174.0	17,296	4,548
Greene.....	340.6	70.5	552.9	628.0	25,080	15,134
Jasper.....	7,159.8	5,330.2	74,141.4	59,162.0	2,152,602	1,650,513
Jefferson.....	277.0	309.0	2,614.0	2,055.0	45,042	40,348
Lawrence.....	2,873.4	1,231.3	12,877.1	13,027.5	324,504	231,951
Madison.....	*3,032.6	*3,715.0			239,091	284,569
Moniteau.....	12.0				480	
Morgan.....	4.5			15.5	90	480
Newton.....	1,757.5	1,863.3	8,285.4	6,990.2	253,906	218,790
St. Francois.....	*16,900.0	*19,464.7			1,232,000	1,449,321
Washington.....	454.4	560.0		125.0	62,028	92,045
	*518.8	*2,260.5				
Total.....	12,909.2	9,469.3	100,248.1	82,357.2	4,355,519	3,990,039
*Pig lead.....	*20,451.4	*25,440.2				

X. TABLE SHOWING CHARACTER, TONNAGE AND VALUE OF OUTPUT OF LEAD AND ZINC MINES IN MISSOURI FOR YEAR ENDING JUNE 30, 1890.

Name of county.	No. of mines.....	Machinery in use.					No. of miners.....		No. of other employees.	Total No. of all employees.....		Total No. of tons mined.		Av. value at mines per ton.		Amount rec'd for yr's total output.		Total amount received for year's output lead and zinc.....		No. of acci-dents.	
		Engines..	Pumps....	Crushers..	Rolls.....	Steam jigs						Lead	Zinc.....	Lead	Zinc.....	Lead	Zinc.....			Fatal	Non-fatal.
Barry.....	1						4			4		30.0	30.0	\$40.00	\$20.00	\$1,200	\$600	\$600			
Christian.....	1											100.0	100.0	\$40.00	16.00	1,600	1,600	2,800			
Dade.....	4											1,637.3	1,637.3	43.88	10.50	17,296	17,296	17,296			
Greene.....	11	3	3				29	20		49		340.6	552.9	43.88	10.50	14,946	10,134	25,080			
Jasper.....	320	125	173	59	61	57	1,185	1,405		2,590		74,141.4	74,141.4	45.34	24.65	324,636	1,827,966	2,152,002	10	9	
Jefferson.....	10						75	19		94		2,614.0	2,614.0	36.00	13.41	9,972	35,070	45,042			
Lawrence.....	108	15	16	3	3	1	304	303		607		2,873.4	12,877.1	44.16	15.35	126,793	197,711	324,504	1	1	
Madison.....	4	3	3				156	100		250		*3,032.6		78.84		239,091		239,091			
Moniteau.....	1											12.0		40.00		480		480			
Morgan.....	1											4.5		20.05		90		90			
Newton.....	58	24	26	4	6	11	142	164		306		1,757.5	8,285.4	49.90	20.06	87,700	166,206	253,906	1		
St. Francois.....	6	5	6	16	16	72	210	425		635		*16,900.0		72.89		1,232,000		1,232,000	1		
Washington.....	10						137			137		{ 454.4		44.79		62,028		62,028			
							{ *518.8					78.20									
Total.....	535	175	227	82	86	141	2,236	2,436		4,672		12,909.2	100,248.1	45.49	22.51	2,098,936	2,256,583	4,355,519	13	10	
*Pig lead.....												*20,451.4		*73.91							

Average—1 fatal accident to 10,300 tons of lead and zinc.

Average—1 non-fatal accident to 13,860 tons of lead and zinc.

XI. TABLE SHOWING CHARACTER, TONNAGE AND VALUE OF OUTPUT OF LEAD AND ZINC MINES IN MISSOURI, FOR THE YEAR ENDING JUNE 30, 1890.

BARRY COUNTY.

	No. of mine.....	No. of shafts.....	Machinery in use.					No. of miners.	No. other employees	Total No. employees	Total number of Av. value at Am't received for				Total amount rec'd for year's output of lead and zinc.
			Engines..	Pumps....	Crushers.	Rolls.	Steam jigs				Lead.	Zinc.	Lead.	Zinc.	
	1	1	4	4	\$600

CHRISTIAN COUNTY.

	1	1	30	100	\$40	16	\$1,200	1,600	2,800
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DADE COUNTY.

	1	1	22.8	10 50	239	289
	2	1	580	10 50	6,090	6,090
	3	1	1,032	10 50	10,836	10,836
	4	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.5	.....	10 50	.....	131	131
Total .....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,617.3	.....	10 50	.....	17,296	17,296

GREENE COUNTY.

	No. of mine.....	No. of shafts.....	Machinery in use.					No. of miners.....	No. other employees	Total No. employees	Total No. tons mined.		Av. value at mines pr ton, yr's total output.		Am't received for yr's total output.		Total am't received for year's out-put of lead and zinc...
			Engines...	Pumps...	Crushers..	Rolls.....	Steam jigs.				Lead.	Zinc.	Lead.	Zinc.	Lead.	Zinc.	
Ash Grove.....	1	1	.....	.....	.....	.....	.....	4	.....	4	25.5	31.4	\$38.47	\$11.32	\$981	\$356	\$1,337
	2	1	.....	.....	.....	.....	.....	.....	.....	.....	10	20	44 00	12 00	440	240	680
	3	1	.....	.....	.....	.....	.....	3	3	6	175	250	44 00	13 00	7,400	3,250	10,950
	4	4	.....	.....	.....	.....	.....	10	7	17	101.6	.....	44 50	.....	4,532	.....	4,532
Mumford.....	1	1	1	1	.....	.....	.....	4	.....	4	.....	38.5	.....	25 00	.....	963	963
	2	1	1	1	.....	.....	.....	2	4	6	13.5	50	42 00	25 00	525	1,250	1,775
	3	2	1	1	.....	.....	.....	6	6	12	16	163	48 00	25 00	768	4,075	4,843
Total	7	11	3	3	.....	.....	.....	23	20	49	340.6	552.9	43.88	18 32	14,946	10,134	25,080

JASPER COUNTY.

	No. of mine.....	No. of shafts.....	Machinery in use.					No. of miners.....	No. other employees	Total No. employees	Total No. tons mined.		Av. value at mines pr ton, yr's total output.		Am't received for yr's total output.		Total am't received for year's out-put of lead and zinc...
			Engines...	Pumps...	Crushers..	Rolls.....	Steam jigs.				Lead.	Zinc.	Lead.	Zinc.	Lead.	Zinc.	
Carthage.....	1	1	1	1	1	.....	.....	3	3	6	.....	100.0	.....	28 00	.....	2,800	2,800
	2	1	1	1	.....	.....	.....	7	9	16	33.5	.....	49 00	.....	1,650	.....	1,650
	3	1	1	1	.....	.....	.....	4	6	10	88.2	64.5	46 00	22 00	4,059	1,418	5,477
	4	2	3	3	1	2	2	10	12	22	.....	766.6	.....	30 00	.....	23,000	23,000
	5	2	2	2	1	1	2	14	24	38	.....	1591.0	.....	25 62	.....	40,775	40,775
	6	1	1	1	.....	.....	.....	12	18	30	.....	20.0	.....	26 00	.....	520	520
Cartersville.....	1	11	3	2	2	3	2	45	48	93	286.5	1734.4	43 69	23 11	12,938	40,187	53,125
	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	116.0	403.1	42 03	21 89	4,944	8,825	13,769
	3	13	3	2	2	2	2	42	45	87	603.6	3008.3	45 00	23 54	27,162	70,850	98,012
	4	4	6	3	2	3	2	26	22	48	.....	1144.6	.....	16 39	.....	18,746	18,746
	5	2	2	3	2	2	5	28	28	56	393.5	1183.0	43 00	25 00	16,920	46,075	62,995
Joplin.....	1	1	1	1	.....	.....	.....	3	4	7	25.0	350.0	45 00	25 00	1,125	8,750	9,875

2	15	5	8	2	3	8	76	82	158	225.3	3091.6	46 00	24 00	10,823	74,198	85,021
3	9	7	8	1	...	...	20	20	40	121.0	1623.0	36 66	24 15	4,438	39,177	43,613
4	6	4	10	2	...	...	29	37	66	526.0	883.7	45 07	26 24	23,710	23,189	46,899
5	9	3	3	4	...	...	26	30	56	172.0	1027.0	48 00	27 50	8,266	28,243	36,499
6	5	3	3	9	...	...	10	12	22	...	219.5	...	23 98	...	5,266	6,266
7	6	3	3	6	...	...	14	20	34	118.2	258.0	46 00	24 00	5,437	6,129	11,629
8	1	2	1	1	...	...	5	6	11	...	101.0	...	22 00	2,222	2,222	2,222
9	15	2	1	1	1	1	43	43	86	376.2	651.2	46 00	22 00	17,305	14,326	31,631
10	6	3	7	2	1	...	8	12	20	1.0	1163.0	46 00	24 00	46	27,912	27,912
11	8	3	3	...	...	...	20	16	36	468.5	2637.0	50 00	24 19	23,325	64,273	87,598
12	1	4	4	...	...	...	...	...	...	64.8	52 00	...	...	3,371	3,371	3,371
13	8	...	...	...	...	...	38	62	100	124.8	1547.0	50 00	24 00	6,240	37,128	43,368
14	3	...	...	...	...	...	10	10	20	...	416.6	...	24 00	...	10,000	10,000
15	3	3	3	1	...	...	14	16	30	...	1080.0	...	26 60	...	28,728	28,728
16	1	1	2	1	1	...	4	6	10	...	4.8	...	20 00	...	96	96
17	11	6	11	2	3	3	32	50	82	117.5	2652.0	44 00	24 99	5,172	66,296	71,468
18	5	1	2	...	...	...	13	21	34	295.0	298.5	48 28	25 32	13,064	7,609	20,573
19	3	2	2	1	1	1	6	8	14	...	72.7	...	25 00	...	1,818	1,818
20	1	2	2	1	1	1	...	...	...	...	171.5	...	25 00	...	4,287	4,287
21	1	2	2	1	1	1	6	11	17	...	50.0	...	25 43	...	1,271	1,271
22	6	...	1	1	1	...	29	36	65	196.0	357.0	48 00	22 00	9,408	7,854	17,262
23	6	...	9	1	1	...	17	35	...	21.0	643.0	46 00	24 00	9,966	15,432	16,398
1	4	1	1	...	...	...	16	16	32	...	284.5	...	23 00	...	6,543	6,543
2	10	2	17	1	2	2	29	42	71	11.6	2,560.0	42 55	27 88	497	72,209	72,706
3	1	...	...	...	...	...	...	...	...	...	100.0	...	28 25	...	2,825	2,825
1	7	3	5	2	2	2	25	26	51	225.0	788.0	44 00	21 00	9,900	16,548	26,448
1	2	...	...	...	...	...	5	...	5	25.0	...	44 00	...	1,100	...	1,100
2	2	...	...	...	...	...	6	...	13	...	...	...	...	...	...	...
2 ^a	45	10	10	11	11	10	177	210	387	1290.0	23,654.0	45 82	24 15	59,108	572,188	631,296
2 ^b	9	1	2	...	...	...	42	62	104	...	...	...	...	...	...	...
3	7	1	1	...	...	...	22	29	51	276.0	334.0	43 26	22 42	11,942	7,491	19,433
4	8	4	3	1	1	...	24	29	53	122.0	647.0	45 00	21 27	5,490	13,762	19,252
5	1	...	...	...	...	...	2	2	4	48.0	148.2	48 00	25 00	2,304	3,705	6,009
6	1	1	2	...	...	...	6	6	12	55.4	76.1	44 00	24 00	2,438	1,826	4,264
7	1	...	...	...	...	...	2	2	4	116.0	...	41 16	...	4,775	...	4,775
8	9	2	2	1	1	1	16	23	39	962.7	39 69	21 63	5,779	20,826	26,605	26,605
9	2	...	...	...	...	...	5	12	17	148.2	1,364.0	50 00	22 27	7,410	30,152	37,562
10	16	6	2	7	8	6	97	102	199	213.8	6,261.5	44 50	24 28	9,514	127,531	137,045
11	2	2	2	1	1	1	14	20	34	1,147.5	...	...	23 52	...	26,999	26,999

Lehigh

Oronogo

Webb City

JASPER COUNTY--Concluded.

	Machinery in use.					No. of miners. . . .	No. other employees	Total No. employees	Total No. tons mined.		Av. value at mines pr ton		Am't received for yr's total output.		Total am't received for year's output of lead and zinc.
	Engines . .	Pumps....	Crusher . .	Rolls.....	Steam jigs				Lead.	Zinc.	Lead.	Zinc.	Lead.	Zinc.	
Zincite	1	1	1	1	1	6	3	6	20.0	800 5	\$43 00	\$24 50	\$19,612	\$19,612	\$19,612
	1	1	1	1	1	2	2	5	2	2	2	2	44	44	910
	1	1	1	1	1	3	2	5	28.5	28.5	27 24	27 24	777	777	777
	1	1	1	1	1	2	3	6	10.0	10.0	20 00	20 00	200	200	200
	1	1	1	1	1	3	3	6	15.0	15.0	25 00	25 00	375	375	375
	1	1	1	1	1	6	4	10	32.0	32.0	24 00	24 00	768	768	768
	1	1	1	1	1	16	16	32	2,074.0	2,074.0	44 00	44 00	49,996	49,996	49,996
	1	1	1	1	1	16	19	35	64.6	1,659 0	44 00	26 50	43,978	43,978	46,820
	1	1	1	1	1	9	10	19	156.0	156.0	23 50	23 50	3,666	3,666	3,666
	1	1	1	1	1	4	6	10	2,750.8	2,750.8	28 03	28 03	77,118	77,118	77,118
	1	1	1	1	1	16	17	33	2.0	74.5	46 00	22 60	1,684	1,684	1,776
Total	60	125	59	61	57	1185	1405	2590	7,159.8	74,141.4	45 34	24 65	324,636	1,827,966	2,152,602

JEFFERSON COUNTY.

1	10	75	19	94	277.0	2614.0	36 00	13 41	9,972	35,070	45,042
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LAWRENCE COUNTY.

	Machinery in use.					No. of shafts	No. of mine	Total No. employees	Total No. tons mined.		Av. value at mines pr ton yr's total output.		Am't received for yr's total output.		Total am't received for year's output of lead and zinc.
	Engines ..	Pumps....	Crushers..	Rolls.....	Steam jigs				Lead.	Zinc.	Lead.	Zinc.	Lead.	Zinc.	
Aurora.....	1	4	3	3	4	4	3	44	8.0	1,159.8	\$33.96	\$272	\$23,196	\$23,196	\$23,196
	2	3	4	8	10	10	10	20	93.0	157.9	36.47	20.07	3,267	3,267	3,539
	3	4	8	18	10	11	11	21	70.0	148.0	48.98	13.00	1,924	1,924	5,316
	4	2	2	11	12	21	21	39	282.5	342.0	40.32	19.54	6,683	6,683	10,112
	5	2	2	11	12	23	23	69	1,437.3	863.3	44.00	15.04	8,327	8,327	19,719
	6	18	2	37	55	77	132	132	185.0	835.0	58.81	24.88	5,466	5,466	68,707
	7	11	2	1	3	32	69	69	331.6	4,918.2	44.33	16.921	20,775	20,775	31,555
	8	11	3	1	30	52	52	52	...	107.0	12.50	...	66,517	66,517	83,438
	9	1	1	1	2	1	3	3	26.4	213.3	50.00	18.09	1,337	1,337	1,337
	10	6	1	1	23	21	44	44	68.0	508.3	22.00	...	3,860	3,860	5,180
	11	1	1	1	4	4	8	8	...	...	1.496	...	1,496	1,496	1,496
	12	7	1	1	18	11	29	29	...	508.3	14.96	...	7,606	7,606	7,606
	13	4	2	1	8	6	14	14	37.5	10.0	46.00	16.00	1,725	1,725	1,885
	14	24	1	3	1	46	93	93	160.4	3,540.0	43.94	13.72	7,049	7,049	55,642
	15	1	1	1	6	10	16	16	123.7	...	45.88	...	5,676	5,676	5,676
Total.....	15	108	15	3	304	303	607	607	2,873.4	12,877.1	44.16	15.35	126,793	197,711	324,504

MADISON COUNTY.

	1	4	3	3	150	100	250	*3032.6	78.84	239,091	239,091	239,091
--	---	---	---	---	-----	-----	-----	---------	-------	---------	---------	---------

* Pig lead.

MONTICAU COUNTY.

	Machinery in use.					No. of shafts.....	No. of mine.....	No. of miners.....	No. other employees	Total No. employees	Total No. tons mined.		Av. value at mines pr ton		Am't received for yr's total output.		Total am't received for year's output of lead and zinc..
	Engines...	Pumps....	Crushers..	Rolls.....	Steam jigs.						Lead.	Zinc.	Lead.	Zinc.	Lead.	Zinc.	
	1	1	1	1	1	1	1	12.0	.....	.....	.....	.....	\$40 00	...	.....	.....	\$480

MORGAN COUNTY.

	1	1	4.5	20 05	90	90
--	---	---	-------	-------	-------	-------	-------	-----	-------	-------	-------	-------	----	-------	-------	-------	----

NEWTON COUNTY.

	1	2	1	1	1	1	1	11	11	22	.....	250.0	22 00	.....	.....	.....	5,500
	2	46	20	24	2	3	9	108	119	227	1687.0	7449.0	50 00	20 00	94,850	148,980	233,830
	3	1	1	.....	.....	.....	.....	4	6	10	35.0	.....	50 00	.....	1,750	.....	1,750
	4	8	2	1	1	2	2	19	28	47	21.5	586.4	46 50	20 00	1,000	11,728	12,726
	5	1	.....	.....	.....	.....	.....	.....	.....	.....	4.0	.....	25 00	.....	100	.....	100
Total.....	5	58	24	26	4	6	11	142	164	306	1757.5	8385.4	49 90	20 06	87,700	166,206	253,906

ST. FRANCOIS COUNTY.

1	2	3	4	12	12	48	80	275	355	*13,600.0	.....	70 00	.....	952,000	952,000
2	4	2	2	4	4	24	130	160	280	*3,300 0	.....	84 84	.....	280,000	280,000
2	6	5	6	16	16	72	210	425	635	16,900.0	.....	72 89	.....	1,232,000	1,232,000
Total.....															

WASHINGTON COUNTY.

1	1	.....	.....	.....	.....	.....	.....	.....	.....	*61.2	.....	72 05	.....	4,410	4,410
2	1	.....	.....	.....	.....	.....	.....	.....	.....	*57.6	.....	72 35	.....	4,162	4,162
3	3	.....	.....	.....	.....	.....	.....	.....	.....	*400 0	.....	80 00	.....	32,000	32,000
4	2	.....	.....	.....	.....	.....	.....	.....	.....	5.4	.....	40 00	.....	216	216
5	1	.....	.....	.....	.....	.....	.....	.....	.....	221.0	.....	54 84	.....	12,120	12,120
6	1	.....	.....	.....	.....	.....	.....	.....	.....	66.0	.....	40 00	.....	2,640	2,640
7	1	.....	.....	.....	.....	.....	.....	.....	.....	162.0	.....	40 00	.....	6,480	6,480
7	10	.....	.....	.....	.....	.....	.....	.....	.....	454.4	.....	44 79	.....	62,028	62,028
Total.....															
*Pig lead.....															
*Pig lead.....															

II (d). TABLE SHOWING CHARACTER OF MINES, AND MACHINERY IN USE BY SUB-OPERATORS OF LEAD AND ZINC MINES FOR YEAR ENDING JUNE 30, 1890.
GREENE COUNTY.

	Kind of power	No. of miners..			Depth of shaft in feet.	Machinery in use.			General remarks.
		Steam	Horse.	Hand.		Total No. of all employees.....	No. of other employees.....	Total No. of all employees.....	
Murray, H.:									
Golden Eagle.....	1	73	3	6					New mine.
Nixon & Murray.....	1	85	2	3					New mine.
Terrapin mine.....	1	70	2	3					
Yellow Hammer.....	1	73	3	5					
Total.....	4	...	10	17					

JASPER COUNTY.

<i>Cartersville.</i>									
Daugherty, Davey & Daugherty:									
Brown mine.....	1	...	2	2					Mine idle at date of inspection
Caff & Co.....	1	...	4	6					
Cooper, Boxley & Co.....	1	147	4	5					
Dalark, Phiney & Co.....	1	141	2	1					
Graham mine.....	1	135	4	3					New mine
Job & Co.....	1	130	4	5					
Foundation & Robinson.....	1	140	7	8					1 boiler and engine, 2 set rolls, 1 crusher, 1 set steam figs
Reed & Phillips.....	1	130	2	1					New mine
Shultz & Robinson.....	1	140	5	6					1 boiler and engine, 1 crusher, 1 set rolls, 1 set steam figs

					New machinery being put in
Yeoman & Co.	1	140	10	9	19
Zagg, Earnest & Co.	1	155	3	2	5
Total	4	7	45	48	93
Davey, Tower & Tower, Davey & Co.				4	4
Copenhaven & Co.	1	70	4	6	10
Daugherty & Co.	1	130	5	6	11
Irvin & Co. (a)	1	30	4	4	8
" (b)	1	30	2	2	4
Jett & Co.	1	140	5	5	10
McCarthy & Co.	1	140	3	4	7
Misplay & Co.	1	120	2	2	2
Moss & Co.	1	78	2	1	3
Oustoll, Grieb & Haines	1	150			
Foundston & Son (a)	1	140	7	9	16
" (b)	1	157			
Shipley Bros.	1	60	6	3	9
Williams, J. W.	1	110	2	1	3
Total	3	9	42	45	87
Joplin.					
Diamond L. and Z. Co.:					
Diamond L. and Z. Co. (a)	1	93	4	3	7
" (b)	1	60	14	18	32
Frye & Co.	1	70	3	7	10
Monett & Co.	1	50	2	3	5
Steen & Kidder (a)	1	60	4	4	8
" (b)	1	40	2	1	3
Total	5	1	29	36	65
Empire L. and Z. Co.				40	40
5 engines, 8 pumps, 1 crusher, 2 sets rolls, 6 sets jigs.....					
Ashley & Co.	1	75	3	4	7
Crouch & Co.	1	64	2	1	3
Empire Zinc Co. (a)	1	85	10	2	12
" (b)	1	91	16	2	18
" (c)	1	79	10	2	13
Rope transmission					
"					
"					
Usually work one mine at a time .					

JASPER COUNTY—Continued.

	Kind of power.		Depth of shaft in feet.	No. of miners.	No. of other employees.	Total No. of all employees.	Machinery in use.	General Remarks.
	Hand..	Horse..						
	Steam.							
Joplin—Continued.								
Empire Zinc Co. (d)	1		88	6	2	8	Rope transmission.....	
Gravat, R. P.		1	60	1	1	2		
Kay, Ellis & Co. (a)	1		60	6	5	11		
" " (b)	1		70					
Lee & Co.	1		60	2	1	3		
Petri Zinc M. Co (a)	1		54	12	17	29	2 steam jigs, 1 set rolls, 1 crusher.....	
" " (b)	1		60					
Saules & Co.	1		60	4	3	7		
Smith & Vaughn.	1		60	2	1	3		
Westernhaver & Co.	1		70	2	1	3		
Total.....	9	5	1	76	82	158		
Granby M. and Smelting Co.:								
Canby & Co.		1	60	3	3	6	1 steam pump, 1 boiler.....	
Dahill & Sons.	1		65	2	1	3		
Dorington, J. C. (a)	1		80	2	3	5	1 engine and boiler, 2 lift pumps, 1 crusher	
" " (b)	1		70	2	2	4		
King, Jack.	1		100	3	4	7	2 steam pumps, 2 engines.	
Lickliter, N. B.	1		70	3	3	6	1 pump and boiler.....	
Maxfield (a)		1					1 engine, 1 lift pump.....	
" (b)		1						
Shannon & Co.		1	80	3	3	6	1 steam pump, 1 boiler.....	
" "		1	80	2	1	3		
Total.....	3	6		20	20	40		Mine not in operation at date of inspection.....

Tomlin & Co. Weyland & Nichols.	1	60	...	5	3	8	Mine idle at date of inspection....
Total	8	...	20	16	36		
Snyder Bros.:							
Belcher M. Co.	1	65	5	9	14		
Carter & Davidson	1	55	4	7	11		
Choctaw M. Co.	1	60	5	6	11		
Frye, S. J.	1	65	3	6	9		
McDonald & Co.	1	58	5	8	13		
Snyder Bros.	1	60	7	9	16		
Smith & Leslie	1	55	5	9	14		
Turner & Lee.	1	60	4	8	12		
Total	3	5	38	62	100		
Taylor & Billingsly				4	4		5 engines, 6 pumps, 1 lift pump, 1 boiler and engine.....
Astor M. Co.	1	95	7	11	18		1 set rolls, 1 set steam jigs.....
Brewer Bros.	1	80	4	5	9		1 pump.....
Buckhorn M. Co. (a)	1	114	3	4	7		1 set steam jigs, 1 set rolls, 1 crusher.....
" (b)	1	80					1 set steam jigs, 1 set rolls, 1 crusher.....
Butteram & Co.	1	65	2	3	6		1 set steam jigs, 1 set rolls, 1 crusher.....
Craylor, Wm.	1	90	3	3	5		1 pump.....
Farnham & Co.	1	103	3	4	7		1 pump.....
Miller & Co.	1	100	2	2	6		1 pump.....
Rauleman & Co.	1	80	2	2	4		1 pump.....
Sapp, B.	1	80	3	5	8		1 pump.....
Yarcho Bros. & Co.	1	85	3	5	8		
Total	3	8	32	50	82		1 engine, 9 pumps, 1 crusher, 1 set rolls...
Thacker M. & Smelting Co.				4	4		
Alford & Good.	1	65	4	3	7		
Bodkins & Co.	1	35	3	3	6		
Hill & Jones (a)	1	20	4	4	8		
" (b)	1						
Shifflett, Owens & Co.	1	40	3	2	5		
Simmons & Co.	1	65	3	2	5		
Total	6		17	18	35		

JASPER COUNTY--Continued.

	Kind of power.		Depth of shaft in feet.....	No. of miners.	No. of other employees.....	Total No. of all employes ...	Machinery in use.	General remarks.
	Steam.	Hand..						
<i>Joplin—Continued.</i>								
Tuckahoe M. Co.....	1	1	60	2	2	2		
Dutch Mine (a).....	1	1	70	3	3	4		
" (b).....	1	1	100	3	7	6		
Goff & Loyd.....	1	1	110	3	5	8	1 engine, 1 pump.....	
Howard Mine.....	1	1	110	3	6	8	1 pump.....	
Thompson & Brown.....	1	1	90	2	2	4		
Total.....	1	4	.....	13	21	34		
<i>Lehigh.</i>								
Leckie Mining Co.....	1	1	80	3	3	4		
Feland & Co.....	1	1	85	2	2	6		
Gady Bros.....	1	1	40	7	3	4		
Medsker & Co.....	1	1	40	7	3	10	1 pump and engines.....	
Wild Goose Co.....	1	1	85	4	4	8		
Total.....	3	1	.....	16	16	32		
Lehigh Drainage & M. Co.....	1	1	56	2	1	8	2 engines and 10 pumps.....	
Carl Junction M. Co.....	1	1	86	7	7	3	1 steam pump.....	Men on strike on account of non-payment of wages.
Cherry Tree M. Co.....	1	1	86	7	7	14	1 steam pump.....	
Haley & Koehitzky.....	1	1	73	2	2	4	1 steam pump.....	
Knight Land.....	1	1	138	7	10	17	1 steam pump.....	Idle at date of inspection.
Neighbors Land (Elm L. & Z. Co).....	1	1	118	7	10	17	2 steam pumps, 1 set rolls, 1 set steam jigs.....	
" ".....	1	1	120	.....	.....	.....
Long String mine.....	1	1	79	.....	.....	.....		Idle on account of water in mine.
Short String mine.....	1	1	78	.....	.....	.....

St. Louis Zinc M. Co.....	1	1	.....	7	8	15	1 steam pump, 1 set rolls, 1 set steam jigs.
White Elephant M. Co.....	1	1	.....	4	6	10	1 crusher, 1 set rolls, 1 set steam jigs..
Total.....	7	3	.....	29	43	71	
<i>Oronogo.</i>							
Granby M. & Smelting Co.....	.....	.....	.....	.....	3	3	1 engine, 2 pumps and 1 crusher.....
Adams & Allen.....	.....	1	55	1	1	2	
Baker & Co.....	.....	1	55	2	1	3	
Bodley & Adams.....	.....	1	35	3	4	7	
Circle M. Co.....	.....	1	170	8	4	12	1 engine, 2 pumps.....
Ellis & Mills.....	.....	1	60	1	1	2	
Glascoff & Son.....	.....	1	45	2	1	3	
Oronogo Union M. Co.....	.....	1	110	8	11	19	1 engine, 1 pump, 1 crusher, 2 sets rolls, 2 sets steam jigs.....
Total.....	2	4	1	25	26	51	
<i>Webb City.</i>							
Center Creek M. Co.....	.....	.....	.....	.....	20	20	2 engines, 10 pumps, 1 crusher, 1 set steam jigs, 1 set rolls.....
Agears & Co.....	.....	1	120	4	3	7	
Allen & Sheldon (a).....	.....	1	180	6	6	12	
" (b).....	.....	1	65	.....	.....	.....
Ankerney & Co.....	.....	1	135	6	6	12	
Bradley & Co.....	.....	1	150	3	4	7	
Carson & Cobb.....	.....	1	130	4	4	8	
Columbia & White.....	.....	1	130	4	2	6	
Columbia & Harlean.....	.....	1	60	8	7	15	1 boiler and engine, 1 set steam jigs, 1 crusher, 1 set rolls.....
Caldwell & Co.....	.....	1	130	2	1	3	
Cooper & Co.....	.....	1	116	6	6	12	
Crawford & Lively.....	.....	1	145	5	5	10	
Davis & Co.....	.....	1	130	4	4	8	
Edward & Wilson.....	.....	1	100	2	6	8	
Evans & Conelly (a).....	.....	1	20	1	1	2	
" (b).....	.....	1	130	3	5	8	
Evans & Co.....	.....	1	140	4	5	9	
Fleishburn, D. G.....	.....	1	160	6	8	14	1 crusher, 1 set rolls.....
Ford & Owens.....	.....	1	120	6	5	11	1 engine and boiler, 1 crusher, 1 set rolls, 1 set steam jigs.....

JASPER COUNTY—Continued.

	Kind of power.	Depth of shaft in feet.....			No. of miners.	No. of other employees.....	Total No. of all employees.....	Machinery in use.	General remarks.
		Hand.	Horse.	Steam.					
Webb City—Continued.									
Fuller & Co.....	1..	60		2	1	3			
Greenfield & Clark.....	1..	100		3	2	5			
Hardie & Irven.....	1..	130		2	3	5			
Hatten, South Lot.....	1..	140		2	3	5			
Hulvey & Co.....	1..	85		3	2	5			
Martolf & Co. (a).....	1..	79		4	3	7			
" (b).....	1..	50		..	..	..
Maloney mine.....	1..	120		2	1	3			
Martin & Connors.....	1..	110		2	2	4			
McMillan & Abbott.....	1..	140		7	7	14		1 crusher, 1 set rolls, 1 set steam jigs.....	
Mock, G. H.....	1..	65		6	6	12		1 crusher, 1 engine and boiler, 1 set rolls, 1 set steam jigs.....	
Moore & Co.....	1..	..		..	..	..		..	Mine idle at date of inspection....
Musser & Co.....	1..	120		2	1	3			
Novall & Crusan.....	1..	130		2	2	4		1 boiler, 1 crusher, 1 set rolls, 1 set steam jigs.....	
Parker Bros.....	1..	125		6	5	11		1 engine, 1 crusher, 1 set steam jigs.....	
Perkins & Co.....	1..	120		4	6	10		1 crusher, 1 set rolls, 1 set steam jigs.....	
Robinson & Co.....	1..	125		2	1	3		..	
Ruhl Bros.....	1..	132		6	11	17		..	
Saxe & Kinser.....	1..	150		3	3	6		..	New mine.....
Shumate & Co.....	1..	110		6	7	13		..	Recently resumed operations.....
Spencer Bros. & Co.....	1..	135		14	11	25		1 engine, 1 crusher, 1 set rolls, 1 set steam jigs.....	
Tompkins & Gammon.....	1..	140		4	5	9		..	
Truitt, Ross & Co.....	1..	120		4	6	10		..	
Vandever & Co.....	1..	140		3	4	7		..	
Varney, Sales & Co.....	1..	124		4	9	13		..	

Webb City L. and Z. Co.....	1	125	2	5	7	1 boiler and engine, 1 set steam jigs, 1 crusher, 1 set rolls.....	
" " ".....	1	130	8	6	14	1 boiler and engine, 1 set steam jigs, 1 set rolls, 1 crusher.....	
Total.....	1134	177	210	387			
Eleventh Hour M. Co.....						1 engine, 1 pump.....	New mine.....
Aylor, Hume & Co.....	1	135	3	3	3		" ".....
Campbell Mine.....	1	120	2	2	4		" ".....
Home Stake.....	1	115	2	4	6		" ".....
Jenkins & Co.....	1	140	4	4	8		" ".....
Llley Bridge Mine.....	1	130	4	4	8		" ".....
Stevenson & Wampler.....	1	110	3	2	5		" ".....
Steward & Watson.....	1	140	4	6	10		" ".....
Total.....	7	22	29	51		4 engines, 3 pumps, 1 crusher, 1 set rolls..	
Garrison L. & Z. Co.....							
Ashcraft & Fullerton.....	1	155	6	6	6		
Baker, Burr & Co.....	1	160	4	8	14		
Burr & Brown.....	1	165	1	1	2		
Capp & Co.....	1	170	3	5	8		
Caldwell & Co.....	1	165	5	5	10		
Fabyan & Co.....	1	165	2	1	3		
Horton & Co. (a).....	1	165	2	2	4		
" (b).....	1	160	1	1	2		
Total.....	35	24	29	53		1 engine, 2 pumps.....	Sub-leased from Union M. Co.....
Nevada M. Co.....							" ".....
Brown & Peppers.....	1	50	2	7	3		
Brown & Merideth.....	1	40	1	1	2		
Conrad & Miller (a).....	1	20	1	1	2		
" (b).....	1	105	8	7	15	1 engine, 1 crusher, 1 set rolls, 1 set stm. jigs.	
Leming & Co.....	1	128	2	1	3		
Union M. Co. (a).....	1	90	2	5	7		New plant being erected.....
" (b).....	1	60					Mine idle at date of inspection.....
" (c).....	1	90					Improvements being made.....
" (d).....	1	80					
Total.....	252	16	23	39			

	1	160	10	13	23	1 crusher, 1 set rolls.	New mine.
Morning Star	1	160	10	13	23	1 crusher, 1 set rolls.	.....
Reed mine.....	1	135	7	12	19		
White & Co.....	1	140	2	3	5		
Total.....	8	8	97	102	199		
<i>Zincite.</i>							
Gretchen L. & Z. Co.:							
Atlas M. Co.....	1	110	3	3	6	1 set stm jigs, 1 eng., 1 crusher, 1 set rolls.	
Butte mine.....	1	100	3	3	6		
East Hollow.....	1	45	7	7	14	1 pump, 1 crusher, 1 set rolls, 1 set stm jigs.	
Eureka mine.....	1	110	3	3	6	1 pump.....	
Total.....	2	2	16	16	32		
Holden, S. B.:							
Degraff & Watkins.....	1	85	5	6	11	1 eng, 1 cru., 1 set rolls, 1 set stm jigs, 1 p.	
Holden, L.....	1	90	3	3	6	1 engine.....	
Holden, Williams & Co.....	1	110	3	3	6	1 pump.....	
Holden & Co.....	1	100	5	7	12	1 pump, 1 set rolls, 1 set stm jigs, 1 crusher.	
Total.....	3	1	16	19	35		
Murphy, Pat.:							
Dandy M. Co.....	1	70	3	3	6		
Kinmouth mine.....	1	80	2	4	6		
Murphy & Co. (a).....	1	85	6	12	12	1 pump.....	
" " (b).....	1	75	1	2	3	1 engine, 1 pump.....	
Shirley M. Co.....	1	60	3	6	9		
South St. Louis.....	1	85	5	7	12	1 pump.....	
Total.....	3	3	20	28	48		
West Hollow L. & Z. Co.....				2	2	1 engine, 1 pump, 1 crusher, 1 set rolls, 1 set steam jigs.....	
Blanchard & Capley (a).....	1	103	2	2	4		
" " (b).....	1	103	2	4	6	1 crusher, 1 set rolls, 1 set steam jigs.....	
" " (c).....	1	80				1 pump.....	
							Mine not in operation at date of inspection

JASPER COUNTY—Concluded.

	Kind of power.		Depth of shaft in feet.....	No. of miners.	No. of other employes.....	Total No. of all employes	Machinery in use.	General remarks.
	Hand..	Horse.						
	Steam.							
<i>Zincite—Concluded.</i>								
Blanchard & Capley (d).....	1	..	65	3	3	6		
Fox, J. A.....	1	..	100	2	2	4		
Huff & Co.....	1	..	110	2	1	3		
Johnson, W. E.....	1	..	80	5	3	8		
Total.....	3	4	..	16	17	33		

LAWRENCE COUNTY.

<i>Aurora.</i>								
Decatur Lead & Zinc Co.:								
Campbell, Jones & Co.....	1	40	2	3	5		18-inch pump and boiler.....	Work one mine at a time.....
Dawson & Son.....	1	35	2	2	4			
Fry & Co (a).....	1	50	2	2	4			
" (b).....	1	45	..	..	..
Grasshopper M. Co.....	1	45	2	1	3			
Linzee M. Co.....	1	60	4	5	9			
Monday & Furby.....	1	40	2	2	4		1 pump and boiler.....	Timbering the shaft.....
Wilson & Co.....	1	65	4	6	10			
Total.....	3	2	18	21	39			
<i>Kentucky Mining Co.:</i>								
Enderwood & Seburn.....	1	60	2	3	5			
Garden & Co.....	1	90	2	2	4			Working at 35 and 60 feet.....

[illegible]

MINES AND MACHINERY IN LEAD AND ZINC MINES—Continued.

Aurora—Continued.									
Kind of power.	Depth of shaft in feet.			No. of miners.	No. of other employees.	Total No. of all employees.	Machinery in use.	General remarks.	
	Hand.	Horse.	Steam.						
Louisville L. & Z. M. & S. Co.:									
Eddington, Taylor Mine.		1		40	2	1	3	Working at 30 feet.	
Golden & Co.	1			60	2	2	4	Same dressing works for all lots.	
Louisville L. & Z. Co. (lot 3)				78	2	15	17	1 pump.	
" (lot 10)	1			65	3	9	12	1 pump.	
" (lot 31)		1		65	3	1	4	Same pump-men emp.	
" (lot 32)		1		70	4	1	5		
" (lot 33)		1		80	3	1	4		
" (lot 39)		1		80	4	1	5		
" (lot 61)		1		18	2	1	3		
McNatt & Oliphant.		1		30	3	3	6		
Thomas, H.		1		30	2	3	5		
Total.	2	5	4		30	38	68		
Midland Mining Co.:									
Buchanan & Moses.	1			40	2	2	4	New mine.	
Byers & Murry.	1			50	2	3	5	Sinking air shaft. New machinery to be put in.	
Katy, H. Mining Co.	1			45	2	3	5	New mine.	
Seaman & Co.	1			75	4	4	8		
Springfield M. Co.	1			80	11	6	17	1 pump and engine.	
Tisdale & Co.	1			56	2	3	5		
Total.	1	5			23	21	44		
Ozark Range Mining Co.:									
Anderson Bros. & Co.	1			90	2	2	4	New mine.	
Barker, G. E.		1		19	2	1	3		

	1	20	2	1	3		
Hubbard & Inch.....	1	20	2	1	3		
Irvy & Rumbaugh.....	1	70	6	4	10		
Knight, G. W.....	1	18	2	1	3		
Thompson & Houck.....	1	20	2	1	3		
Wilson, W. T. & Co.....	1	23	2	1	3		
Total.....	2	5	18	11	29		
Rinker Lead & Zinc Co.:							
Benwood & York.....	1	65	2	1	3		
Clyne & Co.....	1	60	2	2	4		
Emmons & Rinker.....	1	87					Mine had been idle three weeks at date of inspection.....
Gilbert & Co.....	1	30	2	1	3		
James, G. (a).....	1	70	2	1	3		
" (b).....	1	65	3	6	9		
Kelly, Eaton & Co.....	1	60	3	4	7		
Kelly, J. (a).....	1	50	4	4	8		1 pump and 1 boiler.....
" (b).....	1	25					
McBride & Gregory.....	1	40	2	2	4		
McKinley & Son.....	1	40	2	1	3		
Means & Co.....	1	45	2	1	3		
Morrow & Co.....	1	45	2	1	3		Sinking an air shaft.....
Oiley & Ryland (a).....	1	60					1 pump.....
" (b).....	1	50	3	5	8		
Petty & Davis.....	1	35	2	1	3		
Reynolds & Co.....	1	50	4	5	9		
Scullings & Jacobs.....	1	65	2	2	4		
Shorton & Gibbs.....	1	70	2	1	3		
Sims & Co.....	1	40	2	2	4		New mine.....
Spann, Lowry & Co. (a).....	1	65	2	1	3		
" (b).....	1	40	2	2	4		
Wilson & Wiley.....	1	60	2	2	4		Mine recently resumed operations.
Woods, H. & Co.....	1	110	2	2	4		
Total.....	417	3	47	46	93		

NEWTON COUNTY.

	Kind of power.	Depth of shaft in feet.			No. of miners.	No. of other employees.	Total No. of all employees.	Machinery in use.	General remarks.
		Hand.	Horse.	Steam.					
Granby M. & Smelting Co.						34	34	2 engines, 2 crushers, 3 sets rolls, 9 sets steam jigs.	
Adkins & Co.					2	2	4		
Alcohol mine.		1			3	2	5		
Alkire & Co.		1			2	1	3	1 engine, 1 pump.	
Beavers & Co.		1			2	1	3		
Blow Up mine (a)				1	2	1	3		New pump being put in.
" " (b)					2	1	3		
Brigham M. Co.		1			3	2	5	1 engine, 1 pump.	
Brown, James & Co.		1			2	3	5		
Butler, B. mine		1			2	2	4	1 pump.	
Calamine.			1		4	1	5	1 pump.	
Cole & Chester.		1			2	1	3	1 engine, 1 pump.	
Coon mine.			1		2	2	4	1 pump.	
Great Western.		1			2	2	4		
Jim Shaft.			1		2	1	3		
Johnson & Co. (a)			1		3	3	6		
" " (b)			1		3	2	5		
Kincannon & Co. (a)			1		6	5	11	1 engine, 1 pump.	
" " (b)			1		95				
Lambert & Co.			1		2	2	4	1 engine, 1 pump.	
Lanthers & Wells.			1		2	2	4		
Last Chance mine.			1		5	3	8	1 engine, 1 pump.	
Lyneched, J. & Co.			1		2	1	3	1 engine, 1 pump.	
McCurdy south mine.			1		3	2	5		
Moffett & Mulky.			1		2	2	4	1 engine, 1 pump.	
Mulberry M. Co.			1		2	2	4	1 engine, 1 pump.	
Mulberry M. Co.			1		2	2	4	1 engine, 1 pump.	
Need More mine.			1		3	2	5	1 pump.	
Nevada mine.			1		2	2	4	1 engine, 1 pump.	
Newberry & Co.			1		2	2	4		
New Coon mine.			1		2	2	4		

IX. TABLE SHOWING TONNAGE AND VALUE OF OUTPUT OF IRON MINES, YEAR ENDING JUNE 30, 1890.

County.	No. of mine.	No of miners	No. of other employes...	Total No. of employes....	Total No. of tons mined.	Av. value at mines per ton.....	Total amount received for yrs output.	Accidents.	
								Fatal.	Non-fatal.
Crawford.....	1	65	15	80	57,175	\$2 26	\$129,344	.....	.....
Dent	1	60	3	63	21,975	2 00	43,950	.....	.....
	2	.....	.....	.....	6,911	2 37	19,906	.....	.....
Total.....	2	60	3	63	28,886	2 21	63,856	.....	.....
Iron.....	1	40	85	125	59,731	1 45	86,900	.....	.....
Phelps	1	12	8	20	1,775	2 54	4,515	.....	.....
St. Francois	1	174	127	301	85,268	3 41	291,380	1	.....
Total for State	6	351	238	589	232,835	2 47	575,995	1	

ACCIDENTS

In year ending June 30, 1890.

COAL MINES.

Out of the 38 accidents 10 were fatal. Coroners' verdict, in only 4 of these 10 cases. Twenty of these accidents, or 54 per cent, were caused by falling roof of coal, 4 by mining cars, 4 by the flames from shots; the remaining ones from different causes. More accidents have occurred by falling roof and coal than all other causes together, which is also the case in Illinois and Ohio. In 1889 there were 43 lives lost in the coal mines in Illinois, 26 of which were caused by falling roof and coal. The Ohio Mine Inspector's report shows 61½ of all accidents in mines for 1889 to have been due to the same cause.

LEAD AND ZINC MINES.

There were 23 accidents reported to this office from the lead and zinc mines during the year, 13 of which proved fatal, as compared with 12 fatal for the year ending June 30, 1889. On only 2 of these 13 fatal accidents were coroners' verdicts rendered; 3 of the accidents were caused by premature discharge of shots, 7 by falling roof, 3 by falling down shafts, 3 by tubs falling, and the others from different causes.

X. TABLE SHOWING ACCIDENTS

BATES

Name of employer.	Name of employee.	Occupation.	Age.....	Married.....	Single.....	No. of children...	Fatal.....
Keith & Perry Coal Co....	Robert Carter.....	Miner.....	35	1	....	2	1
" " " "....	W. O. Emery.....	Miner.....	31	1	....	4	....
" " " "....	Stephen Campbell..	.....	26	....	1	....	....
" " " "....	E. J. Metz.....	.....	....	....	....	....	....
" " " "....	N. Berrang.....	.....	....	....	....	....	....
Rich Hill Coal M. Co....	F. E. Harding.....	Miner.....	15	....	1	....	....
" " " "....	Charles Robertson..	Cager.....	14	....	1	....	....
" " " "....	David Reese.....	Shot firer	36	1	....	3	....
" " " "....	William McCarron..	Miner.....	17	....	1	....	....
" " " "....	Michael McCarron..	Miner.....	44	1	....	3	....
" " " "....	Alex. McKinnon..	Pit boss.....	....	....	....	....	....
" " " "....	John Morgan.....	Miner.....	....	....	....	....	....
" " " "....	Alex. Wilson.....	Contractor .....	....	1	....	3	1
Western Coal & M. Co....	John Arganbright..	Miner.....	....	....	....	....	....
" " " "....	James Manchester..	Miner.....	23	1	1
Total	5	5	15	3

BOONE

Columbia Coal Co.....	John Walters.....	Mule driver.	25	1
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CALDWELL

Caldwell Coal Co.....	John Hall.....	Miner.....	34	1	5	1
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GRUNDY

Grundy Co. Coal Co.....	George Ward.....	Miner.....	17	1	1
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HENRY

Keith & Perry Coal Co....	Louis Cochrane....	Miner.....	22	1	1
" " " "....	Fred Schnell.....
Total	1	1

IN COAL MINES.

COUNTY.

Non-fatal.....	Time lost in days.	Wages lost.....	Was employee insured?...		Amount of insurance.....	Nature of accident.	Coroner's verdict.
			Yes.	No.			
1	20	\$40		1		Explosion of fire-damp.....	
1	10	20		1		Burned by overcharged shot.....	
1						" " " ".....	
1						" " " ".....	
1	118	118				Flying coal from shot.....	
1	118	118				Leg crushed by car falling on it.....	
1	8	20		1		Premature discharge of shot.....	
1						Arm fractured by falling roof.....	
1						Skull " ".....	
1						Premature discharge of shot.....	
1						Leg broken by falling roof.....	
1						Walked on discharging blast.....	
1				1		Injured by falling roof.....	
						Caused by falling roof.....	
12	274	316		5			

COUNTY.

1	30	45		1		Caught between cars.....	
---	----	----	--	---	--	--------------------------	--

COUNTY.

				1		Killed by falling roof.....	Accidental.....
--	--	--	--	---	--	-----------------------------	-----------------

COUNTY.

				1		Caused by falling roof.....	Accidental.....
--	--	--	--	---	--	-----------------------------	-----------------

COUNTY.

1				1		Walked into ro'm before shot f'd	Accidental.....
1				1		Leg broken by falling roof.....	

ACCIDENTS IN

LAFAYETTE

Name of employer.	Name of employe.	Occupation.	Age.....	Married.....	Single	No. of children...	Fatal.....
Lexington Coal Co.....	M. Helmes.....	Miner.....	36	1	.....	3	.....
“ “	Antonie Fanalio ..	“	25	.....	1	.....	.....
“ “	Frank Leron	Laborer.....	41	1	.....	1	1
Andrew Carter.....	John Carter.....	Miner.....	20	.....	1	.....	.....
Bruce & Knobel.....	Frank Bengerman.	Weighman ..	.....	1	.....	1	.....
Total.....	.....	.....	.....	3	2	5	1

LINN

Kansas & Texas C. Co.....	Frinick White.....	Miner.....	.....	.....	1	.....	.....
“ “ “	Edward White....	“ .....	.....	.....	1	.....	.....
Total .....	.....	.....	.....	.....	2	.....	.....

MACON

Kansas & Texas C. Co.....	John Beane.....	Miner.....	52	1	.....	4	.....
“ “ “	Sherman Watson..	“	38	1	.....	3	1
“ “ “	R. H. Marshall....	“	40	1	.....	5	.....
Loomis & Snively.....	George Jones.....	“	17	.....	1	.....	1
Total.....	.....	.....	.....	3	1	12	2

RANDOLPH

Osage Coal Co.....	Joseph West.....	Miner.....	40	1	.....	6	.....
Exchange mine.....	Windsor Griffiths..	“	21	1	.....	.....	1
Woodward Coal Co.....	Lewis Jones	Mule driver..	35	1	.....	5	.....
Huntsville Coal & M. Co...	W. T. Rutherford..	Weighman..	23	1	.....	.....	.....
John Breckenridge	John Harris.....	Miner.....	44	1	.....	7	.....
“ “	John Beddow.....	“	28	1	3
Total.....	6	21	1

RAY

Hubbell, Hyatt & Hubbell.	Russell Braley....	Miner.....	50	1	7
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COAL MINES—Continued.

COUNTY.

Non-fatal.....	Time lost in days.	Wages lost.....	Was employe insured?		Amount of insurance.....	Nature of accident.	Coroner's verdict.
			Yes.	No.			
1	15	26	.....	.....	.....	Leg fractured by falling coal....	.....
1	.....	.....	.....	1	.....	Falling coal broke his leg.....	.....
1	.....	.....	.....	1	.....	Falling roof broke his back.....	.....
1	.....	.....	.....	1	.....	Crushed by falling roof.....	.....
1	127	190	.....	1	.....	Hurt by cages.....	.....
4	142	216	.....	4	.....	.....	.....

COUNTY.

1	Explosion of fire-damp.....
1	.....	.....	.....	.....	.....
2	.....	.....	.....	.....	.....

COUNTY.

1	12	21	1	Injured by falling roof.....	Due to employe's neg...
1	.....	.....	1	.....	500	Killed by falling roof.....
1	.....	.....	.....	1	.....	Falling roof fractured two ribs..
.....	.....	.....	.....	1	.....	Killed by falling roof.....
2	12	21	1	3	500

COUNTY.

1	130	250	1	2000	Falling coal broke leg and arms..
.....	.....	.....	.....	1	.....	Killed by falling roof.....
1	36	63	.....	1	.....	Caught bet. loaded car and roof.
1	42	74	.....	1	.....	Slipped and cage broke his leg...
1	70	175	1	Falling roof injured his back....	
1	18	45	1	Falling roof.....	
5	296	607	1	5	2000

COUNTY.

1	1
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ACCIDENTS IN LEAD

JASPER

Name of employer.	Name of employee.	Occupation.	Age	Married	Single	No. of children...	Fatal
Circle M. Co.....	Dal Jones.....	Miner.....	29	1	1	1	1
Daugherty & Co.....	George Beasley...	Miner.....	28	1	1	1	1
.....	Carson Hicks.....	Miner.....	16	1	1	1	1
Hardy & Daniels.....	John Prier.....	Miner.....	30	1	1	3	1
Joseph Wright.....	Joseph Wright.....	Miner & op'r.	60	1	1	1	1
.....	James A. Gammon.....	.....	16	1	1	1	1
.....	W. E. Soornes.....	.....	14	1	1	1	1
Jasper L. & Z. Co.....	John Brown.....	Miner.....	22	1	1	1	1
Lamb, Frank.....	George Martin.....	Culler.....	42	1	1	1	1
Montezuma M. Co.....	John Q. Adams.....	Miner.....	43	1	1	5	1
Newell & Co.....	Benj. Garver.....	Miner.....	23	1	1	1	1
Oswego M. Co.....	Loring E. Stinnett.	Miner.....	30	1	1	2	1
Porter & Smith.....	Charles Pruett.....	Miner.....	24	1	1	1	1
Sape and Kniser.....	Jack York.....	.....	34	1	1	1	1
Sherwood mine.....	Richard Reynolds.	Miner.....	21	1	1	1	1
Snyder Bros.....	John Pratt.....	.....	28	1	1	1	1
Victor M. Co.....	Andrew Weir.....	Mine boss...	32	1	1	3	1
Wilmouth & Co.....	James Miller.....	Miner.....	18	1	1	1	1
Whitsett M. Co.....	N. A. Watts.....	Feeder.....	30	1	1	2	1
Total .....	.....	.....	9	9	16	10	

LAWRENCE

Hall's mine.....	E. M. Goodman...	Miner.....	39	1	1	4	1
Maynard & Moore.....	Allen Moore.....	".....	35	1	1	1	1
Total.....	2	5	1		

NEWTON

Roaring Springs.....	Samuel Lesly.....	Miner.....	22	1	1	1	1
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ST. FRANCOIS

St. Joe Lead Co.....	John Melalchick...	Car cager ...	40	1	1	3	1
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ACCIDENTS

ST. FRANCOIS

Iron Mountain Co.....	John Dillon.....	Miner.....	38	1	1	2	1
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AND ZINC MINES.

COUNTY.

Non-fatal.....	Time lost in days..	Wages lost.....	Was employe insured?..		Amount of insurance.....	Nature of accident.	Coroner's verdict.
			Yes..	No..			
1	99	198	...	1	...	Platform fell.....	.....
1	176	352	...	1	...	Premature discharge of shot.....	.....
1	12	24	...	1	...	Premature discharge of shot.....	.....
1	22	44	...	1	...	Hurt by falling roof.....	.....
.....	.....	.....	.....	1	...	Falling roof.....	.....
.....	.....	.....	.....	1	...	Falling roof.....	.....
.....	.....	.....	.....	1	...	Falling roof.....	.....
1	17	25	...	1	...	Fell out of tub.....	.....
.....	.....	.....	.....	1	...	Pulley fell on his head.....	.....
.....	.....	.....	1	.....	4000	Tub fell on him.....	.....
1	.....	.....	1	.....	.....	Went back on shot too soon.....	.....
.....	.....	.....	1	.....	1000	Falling roof.....	.....
.....	.....	.....	.....	1	.....	Overcome by foul air.....	Death by accident.....
1	.....	.....	.....	1	.....	Falling roof.....	.....
.....	.....	.....	.....	1	.....	Fell down shaft.....	.....
1	.....	.....	.....	1	.....	Tub fell on him.....	.....
.....	.....	.....	.....	1	.....	Fell from ladder.....	.....
1	12	18	...	1	...	Falling roof.....	.....
.....	.....	.....	.....	1	...	Fell in crusher.....	.....
9	339	661	2	13	5000

COUNTY.

1	1	Fell down shaft.....
.....	1	" ".....
1	2

COUNTY.

.....	1	Premature discharge of shot.....
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COUNTY.

.....	1	Cage came down on him.....	Accidental.....
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IN IRON MINES.

COUNTY.

.....	1	1000	Falling roof.....
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STRIKES.

Ten strikes occurred among mine employes in the year ending June 30, 1890. Nine of these were in coal mines and one in lead and zinc mines. The results of these strikes were as follows: Four unsuccessful, three compromised, two still unsettled and one unknown. In the seven strikes that have been settled, there were 429 men thrown out of employment, with a loss in wages amounting to \$14,324. For the year ending June 30, 1889, there were 30 strikes reported, but in only eighteen was the wage loss ascertained. In the eighteen strikes there were 909 men thrown out of employment, with a loss in wages amounting to \$56,787.

STRIKES ARRANGED BY COUNTIES.

AUDRAIN COUNTY.

Vandalia Coal Co.—Reduced the price of mining from \$1.00 to 80 cents per ton, July 1; miners struck against the reduction; compromised July 20, by company paying 86 cents per ton.

CLAY COUNTY.

Randolph Coal and Gas Co.—Reduced the price of mining from 9 cents to 6 cents per bushel, March 1. After being out one week, miners accepted the reduction and returned to work. May 1, reduced the price of mining from .06 to .04½ per bushel. Miners struck. After being out three weeks, compromised at .05 per bushel.

JASPER COUNTY.

Cherry Tree Mining Co.—Men struck for non-payment of wages July 16. Result unknown.

MACON COUNTY.

Hillyer & Sterritt Coal Co.—Miners went on strike March 28, for non-payment of wages; strike still unsettled; property advertised for sale.

Little Pittsburg Coal Co.—Miners went on strike April 17, for semi-monthly payment of wages. Compromised after two weeks by company paying once a month, withholding only 4 days' wages as authorized by law.

RANDOLPH COUNTY.

John Breckenridge.—Reduced the price of mining from .60 to .50 per ton. May 15, miners struck ; after 4 days they accepted the reduction.

Higbee Coal and Mining Co.—Discharged a man in July ; after a strike of two months, miners returned to work without the discharged man being reinstated.

Woodward Coal Co.—Miss M. E. Garvey, lessee. Miners struck April 18, because there were no timbers to secure their working places ; mine is still idle.

RAY COUNTY.

Williams Coal Co.—Miners struck April 4, against the weighman, but returned to work May 7, without the weighman being dismissed.

LIST OF COAL MINE OPERATORS IN MISSOURI

That were operating mines during the past year, with location and postoffice address—by counties.

Name of mine operator or company.	Postoffice address.	Mine located near
<i>Adair.</i>		
Novinger, J. B.....	Stahl.....	Stahl.....
Pennsylvania Coal Co.....	Kirksville.....	Stahl and Danforth *
Pickins, D. R.....	Stahl.....	Stahl.....
<i>Audrain.</i>		
Audrain M. T. and Coal Co.....	Vandalia.....	Vandalia*.....
Craig, J. T.....	Mount Carmel.....	Mount Carmel.....
Detleme, D.....	.....	.....
Goodell, R. W.....	Worcester.....	Worcester.....
Hosselton, F.....	Martinsburg.....	Martinsburg.....
Howarth, John.....	Laddonia.....	Laddonia.....
Lynch's mine.....	".....	".....
Montague, J. D.....	".....	".....
Robbins, J. M.....	Worcester.....	Worcester.....
Stephens' mine.....	Laddonia.....	Laddonia.....
Vandalia Coal Co.....	Vandalia.....	Vandalia*.....
Weaver, M.....	Martinsburg.....	Martinsburg.....
<i>Barton.</i>		
Blacker, Owen.....	Esrour.....	Esrour.....
Briston, A. W.....	Lamar.....	Lamar.....
Brookings, James.....	Liberal.....	Liberal.....
Burton, A. M.....	Lamar.....	Lamar.....
Campbell, John.....	".....	".....
Cline, A.....	Esrour.....	Esrour.....
Cole, M.....	Lamar.....	Lamar.....
Commercial Coal Co.....	Liberal.....	Liberal*.....
Ferguson, J. C.....	Nashville.....	Nashville.....
Foote, John.....	Liberal.....	Liberal.....
Gilky, Edward.....	".....	".....
Hanshaw, W. H.....	".....	".....
Hartman, J. N.....	".....	".....
Houston, Harve.....	".....	".....
Morgan, C. H.....	Minden.....	Minden*.....
Nichols, A. K.....	Esrour.....	Esrour.....
Parry, J. C.....	Lamar.....	Lamar.....
Reed, W. E.....	Esrour.....	Esrour.....
Spear, M. M.....	Lamar.....	Lamar.....
Spring, Miss Mattie.....	".....	".....
Sumpter, Wm.....	Liberal.....	Liberal.....
Wait, C. G.....	Pittsburg, Kas.....	Minden.....
Western Coal & M. Co.....	Minden.....	Minden*.....
<i>Bates.</i>		
Allen, A. L.....	Hamilton.....	Worland.....
Armstrong, John.....	Hume.....	Hume.....
Baldwin, L.....	Worland.....	Worland.....
Bruce Bros.....	Rich Hill.....	Shobe.....
Caton, H. F.....	Worland.....	Worland.....
Circle, G.....	Rich Hill.....	Rich Hill.....
Demolt, John.....	Worland.....	Worland.....
Duffield, J.....	Rich Hill.....	Rich Hill.....
Funk, B.....	Foster.....	Foster.....
Hann, Ton.....	Worland.....	Worland.....

*Employ ten or more men.

LIST OF COAL MINE OPERATORS—Continued.

Name of operator or company.	Postoffice address.	Mine located near
<i>Bates—Continued.</i>		
Hines Bros.....	Rich Hill.....	Rich Hill.....
Hopkins Coal Co.....	".....	".....
Hudson, W. H.....	".....	Shobe*.....
Jay, S.....	Shobe.....	" *.....
Keith & Perry Coal Co.....	Kansas City.....	Rich Hill*.....
Lewis, John.....	Worland.....	Worland.....
Lucas, W. W.....	Rich Hill.....	Rich Hill†.....
Mace, W. H.....	Foster.....	Foster.....
Martin, Mike.....	Rich Hill.....	Rich Hill.....
McBride, John.....	Worland.....	Worland.....
Pearson, Peter.....	Rich Hill.....	Rich Hill.....
Powers, J. A. J.....	Shobe.....	Shobe†.....
Rich Hill Coal Mining Co.....	Rich Hill.....	Rich Hill†.....
Ruffener, D.....	Worland.....	Worland.....
Scott, John.....	Rich Hill.....	Rich Hill.....
Scrivener, M.....	Foster.....	Foster.....
Spencer, O.....	Rich Hill.....	Rich Hill.....
Springer, H. N.....	Worland.....	Worland.....
Talbot, S. M.....	Foster.....	Foster.....
Taylor, L.....	Sprague.....	Sprague.....
Western Coal and M. Co.....	Foster.....	Foster†.....
Wise Coal Co.....	Rich Hill.....	Rich Hill†.....
<i>Boone.</i>		
Alspack, Henry.....	Brown's Station.....	Brown's Station.....
Beakmore, T.....	Harrisburg.....	Harrisburg.....
Bennefield, B.....	Columbia.....	Columbia.....
Columbia Coal Co.....	".....	" *.....
Crews, W. P.....	Perche, Randolph Co.....	Perche.....
Davis, Isaac.....	Brown's Station.....	Brown's Station.....
Ewens, B.....	Centralia.....	Centralia.....
Gaither, James W.....	Brown's Station.....	Brown's Station.....
Gellaspy, John.....	Columbia.....	Columbia.....
Gillm, G. M.....	Harrisburg.....	Harrisburg.....
Goodding, W.....	Columbia.....	Columbia†.....
Johnson, T. M.....	".....	".....
James, W.....	Brown's Station.....	Brown's Station.....
Kurtz, D. W. B.....	Columbia.....	Columbia.....
Oldham, Henry.....	Centralia.....	Centralia.....
Petro, W. C.....	Brown's Station.....	Brown's Station.....
Quittir, L.....	Columbia.....	Columbia.....
Short, J. R.....	Harrisburg.....	Harrisburg.....
Stidhome, W. A.....	".....	".....
Stone, J. W.....	Perche, Randolph Co.....	".....
Weldon, Edward.....	Hallsville.....	Hallsville.....
Wiley, G. M.....	Centralia.....	Centralia.....
Winterhater, John.....	Brown's Station.....	Brown's Station.....
<i>Caldwell.</i>		
Hamilton Coal Co.....	Hamilton.....	Hamilton†.....
<i>Callaway.</i>		
Bishop, R. L.....	Fulton.....	Fulton.....
Castle, William.....	".....	".....
Harris, John.....	".....	".....

* Employ 10 or more men.

LIST OF COAL MINE OPERATORS—Continued.

Name of operator or company.	Postoffice address.	Mine located near
<i>Callaway—Continued.</i>		
Harris, A. & Bros.....	Fulton.....	Fulton †.....
Henderson, J. S.	"	"
Laines, R.	"	"
Maycock, Sarah	"	"
Metcalf, John	Stephens' Store.....	Stephens' Store.....
Mussinghoff, Jacob	Fulton	Fulton
Mussinghoff, John	"	"
Simmons & Thomas	"	"
Smith, James.....	"	"
Thorp & James	"	"
<i>Chariton.</i>		
Pierce, E. W.....	Keytesville.....	Keytesville
<i>Clay.</i>		
Randolph Coal & Gas Co.....	Kansas City.....	Randolph*.....
<i>Cooper.</i>		
Brink, E. P.....	Boonville	Boonville
Missouri Cannel Coal Co.....	"	"
Palmberg, A.	Bunceton	Bunceton
Reinhart Coal & M. Co.....	Boonville	Boonville
<i>Dade.</i>		
Leonard & Zook.....	Sylvania.....	Sylvania
Riley, J	"	"
<i>Grundy.</i>		
Grundy County Coal Co.....	Trenton	Trenton.....
<i>Henry.</i>		
Baldwin & Fonda Coal Co.....	Calhoun	Calhoun*.....
Blair Diamond mines.....	Brownington	Brownington*.....
Bush, Wm.....	Deepwater.....	Deepwater.....
Co-operative Coal Co.....	Lewis Station	Lewis Station*.....
Dunlap Coal Co.....	Brownington	Brownington
Garland, R.....	Deepwater.....	Deepwater
Hagman & Eaton	Brownington	Brownington.....
Hobbs & White.....	Deepwater	Deepwater
Hurst, John.....	Hartwell.....	Hartwell.....
Kay Coal Co.....	Deepwater	Deepwater.....
Keith & Perry Coal Co.....	Kansas City	"
Majors, G.....	Calhoun	Calhoun
McFadden, James.....	Deepwater.....	Deepwater.....
Mundy, B. F.....	Clinton	Clinton
Noble, H. T.....	North	North
Owen, B. L.....	Clinton	Clinton
Pigg, D. B. & Co.....	Lewis Station.....	Lewis Station*.....
Pitcher, George.....	Clinton	Clinton
Rush, Wm.....	Deepwater.....	Deepwater.....
Stephens, H. H.....	Brownington	Brownington.....
Tebbo Coal Co.....	Lewis Station.....	Lewis Station*.....
Togleson, Peter.....	Clinton.....	Clinton
Woods & North.....	North.....	North*

* Employ 10 or more men.

LIST OF COAL MINE OPERATORS—Continued.

Name of operator or company.	Postoffice address.	Mine located near
<i>Howard.</i>		
Bain, George & Co.....	Higbee, Randolph Co	Higbee
<i>Johnson.</i>		
Boyd & Sons.....	Montserrat	Knob Noster*.....
Bullock, D. A.....	"	Montserrat
Carroll, B.....	Knob Noster.....	Knob Noster.....
Evans, J. B.....	Warrensburg	Warrensburg
Fitch, P. D.....	Montserrat	Montserrat
Henry, John.....	Warrensburg	Warrensburg
House, John.....	Montserrat.....	Montserrat
Melly, M. B.	Warrensburg	Warrensburg
Murley, Joseph.....	Montserrat	Montserrat
Wood, B. T.	Warrensburg	Warrensburg
<i>Lafayette.</i>		
Bonanza Coal Co.....	Higginsville.....	Higginsville†.....
Bruce & Knoble.....	"	"
Carter, A.....	Wellington	Wellington.....
Corder Coal & Coke Co.	Corder.....	Corder†.....
Excelsior Coal & Coke Co.....	Higginsville	Higginsville†.....
Farmer Coal Co.....	Kansas City	"
Grear, W. H.....	Lexington	Lexington.....
Gunn Coal Co.....	Higginsville.....	Higginsville†.....
Hagood Coal Co.....	"	"
Hartman & Gilbert.....	Waterloo.....	Waterloo†.....
Bawkins & Smith.....	Higginsville.....	Higginsville.....
Jackson & Taggart.....	"	"
Kist, Joseph.....	Lexington.....	Lexington
Lafayette Coal Co.....	"	"
Lexington Coal M. Co.	"	"
Lexington & Dover Coal Co.....	"	Dover†.....
Lordick & Kelly.....	"	Lexington.....
Macey, Henry.....	Kansas City.....	"
Mason Coal Co.....	Higginsville.....	Higginsville
McCarty, C. T.....	Corder.....	Corder.....
McGrew, J. C.....	Lexington	Lexington†.....
Missouri River Coal Co.....	"	Napoleon†.....
Morrison Bros.....	"	Lexington
Napoleon Coal & M. Co.....	Napoleon	Napoleon†.....
O'Maley, A.....	Lexington	Lexington
Republican Coal Co.....	Higginsville.....	Higginsville†.....
Rocky Branch Coal Co.....	"	"
Seawell Coal Co.....	Kansas City.....	Wellington
Stealy & Fowler.....	Higginsville.....	Higginsville†.....
Strasburg & Son.....	Mayview	Mayview†.....
Walton, Tom.....	Lexington	Lexington
Wellington Coal Co.....	Wellington.....	Wellington†.....
Winsor Coal Co.....	Kansas City.....	Higginsville†.....
<i>Linn.</i>		
Clark, George.....	Brookfield	Brookfield
Kansas & Texas Coal Co.....	St. Louis	Marcelline†.....
Morris, J. M.....	Brookfield	Brookfield.....
Shafer, B.....	"	"

*Employ 10 or more men.

LIST OF COAL MINE OPERATORS—Continued.

Name of operator or company.	Postoffice address.	Mine located near
<i>Livingston.</i>		
Cox, A.....	Chillicothe.....	Chillicothe.....
Cox, W. A.....	“.....	“.....
<i>Macon.</i>		
Bachelor, George.....	Macon City.....	Macon City.....
Hillyer & Sterritt.....	Topeka, Kan.....	“†.....
Kansas & Texas Coal Co.....	St. Louis.....	Ardmore†.....
Little Pittsburg Coal Co.....	Kansas City.....	Lingot.....
Loomis & Snively Coal Co.....	Bevier.....	Bevier*.....
Oakdale Coal Co.....	“.....	“†.....
Wardell, T. E.....	Macon City.....	“†.....
Watson Coal Co.....	Bevier.....	“†.....
<i>Miller.</i>		
Rusk, L.....	Eldon.....	Eldon.....
<i>Monroe.</i>		
Hugh, Lad.....	Victor.....	Victor.....
Massey, Wm.....	Duncan's Bridge.....	Duncan's Bridge.....
Near, A. E.....	“.....	“.....
<i>Montgomery.</i>		
Moel, B.....	Wellsville.....	Wellsville.....
Shephard's mine.....	“.....	“.....
Vandalia Coal Co.....	“.....	“*.....
Whitehead, Henry.....	“.....	“.....
<i>Morgan.</i>		
Martin, S.....	Versailles.....	Versailles.....
<i>Phelps.</i>		
James, Wm.....	St. James.....	St. James.....
<i>Putnam.</i>		
Corder, D. M. S.....	Unionville.....	Unionville.....
DeGarmo, George.....	“.....	“.....
Gorman, James.....	Dean, Iowa.....	Dean.....
Mendota Coal and M. Co.....	Mendota.....	Mendota*.....
Parker, Robert.....	Unionville.....	Unionville.....
Pherigo, Martin.....	“.....	“.....
Shadwick, Oliver.....	“.....	“.....
Viles, W. R.....	“.....	“.....
<i>Ralls.</i>		
Bell, H. B.....	Perry.....	Perry.....
Boulware, E. S.....	“.....	“.....
McElroy, T. S.....	“.....	“.....
Russell, John.....	“.....	“.....
<i>Randolph.</i>		
Breckenridge, John.....	Huntsville.....	Huntsville*.....
Brennan, Wm.....	Moberly.....	Moberly.....

*Employ 10 or more men.

LIST OF COAL MINE OPERATORS—Continued.

Name of operator or company.	Postoffice address.	Mine located near
<i>Randolph—Continued.</i>		
Cornelison, M. P.	Perche	Perche
Cross, John	Huntsville	Huntsville
Edwards, E.	"	"
Eureka Coal Co.	"	"
Ferguson, A.	"	"
Higbee Coal & M. Co.	Higbee	Higbee*
Huntsville Coal & M. Co.	Huntsville	Huntsville*
Inter-State Coal & M. Co.	Higbee	Higbee*
Jones, George	"	Higbee
Klingman, J. F.	Moberly	Moberly
McDonald's mine	Huntsville	Huntsville
McKernan, Joseph	Moberly	Moberly
Milborn, Joseph	Thomas' Hill	Thomas' Hill
Mitchel, Wm	Huntsville	Huntsville
Moberly Mutual Coal Co.	Moberly	Moberly
Morris, John	Huntsville	Huntsville
Osage Coal & M. Co.	Elliott	Elliott*
Phillips, S. E.	Huntsville	Huntsville
Rogers, John	"	"
Rucker, W. M.	"	"
Shaw, Charles	Moberly	Moberly
Stewart & Romesburg	Huntsville	Huntsville
Ward, Harry	Moberly	Moberly
Ward, E.	Renick	Renick
Waters, S. A.	Lorick's Mill	Lorick's Mill
Walters, N.	"	"
Williams, Johh.	Moberly	Moberly
Woodard Coal & M. Co.	Huntsville	Huntsville
<i>Ray.</i>		
Black Diamond mine	Richmond	Richmond
Bovard-Brown Coal Co.	Kansas City	Camden*
Ford, J. T.	Richmond	Richmond
Hubbell Coal Co.	"	"*
Hubbell, Hyatt & Hubbell	"	"*
Hughes, Berry	"	"
Kansas & Texas Coal Co.	St. Louis	Fleming*
Martin Coal Co.	Richmond	Richmond*
Mosby & James	"	"
Rankins, W. D.	"	"
Richmond Coal Co.	"	Richm'd & Camden*
Williams, R. J.	Swanwick	Swanwick*
<i>Saline.</i>		
Aner, M.	Slater	Slater
Cardell Coal Co.	Marshall	Napton
Copland, J. B.	Slater	Slater
Haynes, J. R.	"	"
Tennile, George	"	"
<i>Schuyler.</i>		
James, W. T.	Coatsville	Coatsville
<i>Shelby.</i>		
Givan, D. H.	Shelbina	Shelbina
Tompkins, W.	Hennewell	Hennewell
Yost, W. T.	Pansy	Pansy

*Employ 10 or more men.

LIST OF COAL MINE OPERATORS—Continued.

Name of operator or company.	Postoffice address.	Mine located near
<i>Vernon.</i>		
Allen, R. E.....	Rich Hill, Bates Co..	Carbon Center.....
Allen, L.....	Bellamy.....	Bellamy.....
Burdick, D.....	".....	".....
Cargill, Wm.....	".....	".....
Devere, J. M.....	Moundville.....	Moundville.....
Givans, M.....	Carbon Center.....	Carbon Center.....
Gonterman, W. G.....	Sheldon.....	Sheldon.....
Hill, W. L.....	Moundville.....	Moundville.....
Hoss, G. S.....	Nevada.....	Carbon Center.....
Hurst, E. H.....	Carbon Center.....	".....
McCombs Bros. & Co.....	Rich Hill, Bates Co..	Bedford.....
Robinson, W. D.....	Moundville.....	Moundville.....
Shelton, B. F.....	Bellamy.....	Bellamy.....
Smith, J. M.....	Carbon Center.....	Carbon Center.....
Yeates, E. M.....	Rich Hill, Bates Co..	Bedford.....

LIST OF LEAD AND ZINC MINE OPERATORS IN MISSOURI

Who operated mines during the year ending June 30, 1890, with location and post-office address.

Name of mine operator.	Postoffice address.	Mine located near
<i>Barry.</i>		
Brown & Eaton.....	Purdy.....	Purdy.....
Hofford, G. H.....	".....	".....
<i>Dade.</i>		
Hughes, E. B.....	Greenfield.....	Greenfield.....
Nixon, A. F.....	Everton.....	Everton.....
Southwest Mining Co.....	".....	".....
<i>Greene.</i>		
Duncan, J. K. F.....	Ash Grove.....	Ash Grove.....
Eversol & Eaton.....	Mumford.....	Mumford.....
Goetz land.....	Ash Grove.....	Ash Grove.....
James River mine.....	Springfield.....	Mumford.....
Murray, H.....	Ash Grove.....	Ash Grove.....
McCord, Dr. J. F.....	Billings.....	".....
Pearson Creek M. Co.....	Springfield.....	Mumford.....
<i>Hickory.</i>		
Charles L. McQueen.....	Cross Timbers.....	Cross Timbers.....
<i>Jasper.</i>		
Globe Mining & M. Co.....	Carthage.....	Carthage.....
Herrin & Myers.....	".....	".....
Hubbs & Puckett.....	".....	".....
Little Jersey L. & Z. Co.....	".....	".....
Myers & Jennison.....	".....	".....
Porter Mining Co.....	".....	".....

LIST OF LEAD AND ZINC MINE OPERATORS—Continued.

Name of operator or company.	Postoffice address.	Mine located near
<i>Jasper—Continued.</i>		
Daugherty & Davey	Cartersville	Cartersville
Daugherty, Davey & Daugherty.....	"	"
Davey, Tower & Co., and Tower, Davey & Co.	"	"
Jasper County M. Co.	"	"
Motley Mining Co.	"	"
Davis, Moore & Springs.....	Joplin.....	Joplin.....
Diamond Lead & Zinc Co.	"	"
Empire Zinc Co.	"	"
Granby M. & S. Co.	"	"
Guinn & Loyd	"	"
Interstate M. Co.	"	"
Jasper M. Co.	"	"
Joplin Consolidated M. Co.	"	"
Kansas City L. & Z. Co.	"	"
Mahaska L. & Z. Co.	"	"
Murphy, Byers & Connors.....	"	"
Oswego Mining Co.	"	"
Pinkard Mine	"	"
Snyder Bros.	"	"
South Joplin L. & Z. Co.	"	"
State Line Mining Co.	"	"
Sterling L. & Z. Co.	"	"
Swartz, P. L.	"	"
Taylor & Billingsly	"	"
Thacker M. & S. Co.	"	"
Tuckahoe M. Co., operated by E. Loyd.	"	"
Viroqua L. & Z. Co.	"	"
Whitsett M. Co.	"	"
Gulch M. & S. Co.	Lehigh.....	Lehigh
Leckie, W. M.	Joplin.....	"
Lehigh Draining & M. Co.	Lehigh.....	"
Granby M. & S. Co.	Oronogo	Oronogo.....
Oronogo Union M. Co.	"	"
Center Creek M. Co.	Webb City	Webb City
Eleventh Hour M. Co.	"	"
Garrison L. & Z. Co.	"	"
Gaston mines	"	"
Houghton & Son.....	"	"
Jasper L. & Z. Co.	"	"
Keller Mining Co.	"	"
Lewis, J. T.	"	"
McCorkle Hill, operated by C. C. M. Co.	"	"
Nevada Mining Co.	"	"
Quick Work mine, op'ted by C. C. M. Co.	"	"
Steelman, A. T.	"	"
Tracy L. & Z. Co.	Joplin.....	"
Victor Zinc Co.	"	"
Black & Co.	Zincite	Zincite.....
Block City mines	"	"
Buckeye Mining Co.	"	"
Chatman Mining Co.	"	"
Concentration L. & Z. Co.	"	"
Cottonwood Mining Co.	"	"
Gretchen L. & Z. Co.	"	"
Holden, S. B.	Joplin.....	"
Murphy, Pat.	"	"
Rosemond Mining Co.	Zincite	"
Sherwood mines	"	"
Standard L. & Z. Co.	Joplin.....	"
West Hollow L. & Z. Co.	Zincite.....	"

LIST OF LEAD AND ZINC MINE OPERATORS—Continued.

Name of operator or company.	Postoffice address.	Mine located near
<i>Jefferson.</i>		
Valle's Mining Co.....	Valle's Mine.....	Valle's Mine.....
<i>Lawrence.</i>		
Aurora Zinc Co.....	Aurora.....	Aurora.....
Brinkerhoff Mining Co.....	".....	".....
Dayton Mining Land.....	".....	".....
Decatur L. & Z. Co.....	".....	".....
Kentucky Mining Co.....	".....	".....
Lehnard, Newman & Folk.....	".....	".....
Liles, J. T.....	".....	".....
Louisville L. & Z. Co.....	".....	".....
Lyon, L.....	Springfield.....	".....
Midland Mining Co.....	Aurora.....	".....
Nevada Gem Mining Co.....	".....	".....
Ozark Range Mining Co.....	".....	".....
Reed, C. A.....	".....	".....
Rinker L. & Z. Co.....	".....	".....
Vance, J. T.....	".....	".....
<i>Madison.</i>		
Mine La Motte.....	Mine La Motte.....	Mine La Motte.....
<i>Moniteau.</i>		
Woodworth, J. D.....	Enon.....	Enon.....
<i>Morgan.</i>		
Rich Hill Lead & Zinc Co.....	Versailles.....	Versailles.....
<i>Newton.</i>		
Baker & Co.....	Joplin, Jasper Co.....	Joplin.....
Granby M. & S. Co.....	Granby.....	Granby.....
Norton Mining Co.....	Joplin, Jasper Co.....	Joplin.....
Roaring Springs Land & M. Co.....	".....	".....
Potwin & Co.....	Seneca.....	Seneca.....
<i>St. Francois.</i>		
Doe Run Lead Co.....	Doe Run.....	Doe Run.....
St. Joe Lead Co.....	Bonne Terre.....	Bonne Terre.....
<i>Washington.</i>		
Flynn, J. & M. M.....	Richwood.....	Richwood.....
Higginbotham, J. T.....	Fertile.....	Fertile.....
Long, James.....	Potosi.....	Potosi.....
McArthur Bros.....	".....	".....
Palmer Lead Co.....	Palmer.....	Palmer.....
Shibboleth Lead Co.....	Cadet.....	Cadet.....
Stockings, Charles.....	Richwood.....	Richwood.....
Union M. & S. Co.....	Old mine.....	Old mine.....
White, Mrs. L. I.....	".....	".....

LIST OF IRON MINE OPERATORS IN MISSOURI

That were operating mines during the past year, with location and postoffice address.

Name of operator or company.	Postoffice address.	Mine located near
<i>Crawford.</i>		
Cherry Valley mines.....	Midland.. ..	Midland
<i>Dent.</i>		
Midland Blast Furnace Co.....	St. Louis.....	Condray.....
Dent Iron Co.....	Salem.....	Salem.....
<i>Iron.</i>		
St. Louis Ore & Steel Co.....	St. Louis	Pilot Knob.....
<i>Phelps.</i>		
Williams, James.....	St. James.....	St. James.....
<i>St. Francois.</i>		
Iron Mountain Co.....	Iron Mountain.....	Iron Mountain.....

NEW AND OLD COAL MINES.

During the year ending June 30, 1890, there have been twelve coal mines abandoned, one in Barton county, four in Bates, two in Henry, one in Lafayette, one in Macon, one in Randolph, one in Ray and one in Saline. Lafayette and Henry counties have shown the greatest increase in new mines, the former four and the latter five, while only one mine has been abandoned in Lafayette and two in Henry, an increase of three in each county. Following is the record of new coal mines opened and coal mines worked out or abandoned:

County.	New coal mines opened.	Coal mines worked out or abandoned.
Barton....	A. B. Kirkwood.....	Betz Coal Co.....
Bates	Anderson & Hudson.....	Rich Hill Coal Co. No. 1.....
	Western Coal & Mining Co. No. 2.	“ “ “ “ 5.....
	Rich Hill Coal Co. (Hudson) ...	“ “ “ “ (Hudson).....
	“ “ “ “ (Martin).....	“ “ “ “ (Martin).....
Henry.....	Co-operative Coal Co.....	.....
	Devereux & Thompson.....	.....
	Hagman & Eaton No. 2.....	Hagman & Eaton No. 1
	Pigg Coal Co.....	.....
	Tebo Coal Co.....	Tebo Coal Co
Lafayette.	Lexington Coal & M. Co.....	Lexington Coal & M. Co.....
	Stealy & Fowler Coal Co .....	.....
	Stealy & Fowler Coal Co.....	.....
	Kelly & Lordick .....	.....
Linn.....	Kansas & Texas Coal Co .....	.....
Macon....	T. E. Wardell No. 4.....	Kansas & Texas Coal Co. No. 26½
Randolph.	Inter-state Mining Co.....	Kansas & Texas Coal Co.....
Ray.....	Bovard-Brown	George Gregory.....
	Joseph Pickering & Co.....	.....
Saline.....	Wilburn Coal Co	Wilburn Coal Co.....
Vernon ...	Hurst & Griffith.....	.....

IMPROVEMENTS MADE IN COAL MINES.

There has been great improvement in many mines in the State during the past year. Companies are erecting fans to take the place of furnaces. During the past year there have been nine fans erected, ten air shafts and seven escapement shafts sunk, besides two second openings made. Heretofore some of the mine operators have been claiming shafts in which furnaces were located to be second openings, but as the law requires that there shall be at least two distinct means of ingress and egress for all persons employed or permitted to work

in any mine, such mines as came under my notice have been required to make second openings, insuring safety to the workmen.

Twenty-one new coal mines have been opened, located in the following counties: Barton, Bates, Henry, Lafayette, Linn, Macon, Randolph, Ray, Saline and Vernon.

Improvements made in coal mines in State during year ending June 30, 1890:

Air shafts sunk.....	10	Hoisting engine.....	1
Boilers put in.....	2	Latch at top of slope.....	1
Cages rebuilt.....	2	Roadway around shaft bottom.....	1
Connection with second opening.....	2	Safety catches.....	2
Escapement shafts sunk.....	7	Stairway built.....	1
Fans erected.....	9		

Detailed statement of improvements made in coal mines during year ending June 30, 1890—by counties:

Audrain.....	Vandalia Coal Co.....	Put in a new boiler, and made connection with second opening.....
	Audrain M. C. M. Co.....	Connection with second opening...
Barton.....	C. H. Morgan.....	Hoisting engine and pump.....
Bates.....	Keith & Ferry Coal Co.....	Extra escapement shaft retimbered; stairway built at No. 5; new safety catches at No. 6.....
	W. W. Lucas.....	Air shaft.....
	Rich Hill Coal M. Co.....	Extra escapement shaft at No. 2...
	" " " ".....	14-foot fan rebuilt at No. 14.....
	" " " " (Hudson).....	Latches at top of No. 4 slope.....
	Western C. & M. Co.....	Air shaft.....
Callaway.....	A. Harris & Co.....	Air shaft at No. 1.....
Clay.....	Randolph Coal & Gas Co.....	Air shaft.....
Caldwell.....	Hamilton Coal Co.....	12-foot fan.....
Grundy.....	Grundy County Coal Co.....	Boiler put in.....
Lafayette.....	Bonanza Coal Co.....	10-foot fan.....
	Excelsior Coal Co.....	Air and escapement shaft.....
	Hagood Coal Co.....	10-foot fan.....
	Lexington & Dover C. Co.....	Air and escapement shaft.....
	Missouri R. C. Co.....	Air shaft sunk and furnace erected.
	Napoleon Coal Co.....	Air and escapement shaft.....
	Wellington Coal Co.....	Escapement shaft.....
Macon.....	Hillyer & Sterritt C. Co.....	Air shaft sunk.....
	Kansas & Texas Coal Co.....	Escapement shaft and 10-foot fan..
	Loomis & Snively.....	Air shaft at No. 26.....
	Oakdale Coal Co.....	10-foot fan at mine No. 1.....
	T. E. Wardell.....	10-foot fan erected and escapement shaft sunk.....
Montgomery.....	Vandalia Coal Co.....	Air and escapement shaft at No. 4.
Randolph.....	John Breckenridge.....	Air and escapement shaft.....
	Higbee Coal Co.....	10-foot fan.....
	Oswego Coal & M. Co.....	Roadway around shaft bottom.....
Ray.....	Kansas & Texas C. Coal.....	New cages and safety catches.....
	Richmond Coal Co.....	12-foot fan.....
		Retimbered No. 5.....

IMPROVEMENTS SUGGESTED IN COAL MINES.

Great care should be taken in and about the mines to guard against accidents. Although some accidents that occur are due to the carelessness of the miners themselves, there are many that might be avoided if the proper precautions were taken by the companies. A code of signals between the engineer, topman and cager should be conspicuously posted at the top of hoisting shaft.

Signals should be as follows:

One bell from bottom to engineer to hoist coal or empty cage, and also to stop cage when in motion.

Two bells to lower cage.

Three bells to signify that men are coming up (no one should be allowed on the cage until the signal is returned from the engineer); after signal is received from engineer, men can get on cage and ring one bell to hoist.

Four bells should signify to hoist slowly, implying danger.

I have found two or three mining companies that had powder magazines in their mines, which is extremely dangerous, and cannot be too severely condemned.

I trust the Thirty-sixth General Assembly will consider this subject, and take some means to prevent the continuance of this practice. In all cases that came under my notice the companies were requested to move the powder out of mines at once; which was done.

IMPROVEMENTS MADE AND SUGGESTIONS IN LEAD AND ZINC MINES.

There has been a large increase in the output of lead and zinc during the past year in Southwest Missouri. The ore commands a good price, and there is a ready market for it as soon as it is cleaned. Several companies have made new developments in Jasper, Lawrence, Greene and Dade counties. Considerable prospecting, with good promise for the future, is reported from Miller, Hickory and Barry counties. The new mines on the Allen land, near Joplin, Jasper county, which have been opened during the past year, are probably the most productive developments that have been discovered in the county since the discovery of Sucker flat, near Webb City, in 1888. The output from the Allen tract, which is operated by the Diamond Lead and Zinc Co. and Snyder Bros., is 200 to 445 tons of zinc and from 30,000 to 50,000 pounds lead ore per week.

The Empire Zinc Company is erecting a good dressing plant near Joplin, and a new development has been made by the South Joplin

Lead and Zinc Co.; there are also several other companies making valuable improvements at their mines, which time and space will not permit me to mention individually.

There is probably more prospecting going on in Jasper county now than ever before. After going carefully over the county to each mine, and to many of the tracts of land that were being prospected, I am of the opinion that at least 35% of the men employed in the lead and zinc mines of Jasper county are prospectors, or men who are working with the hope of making a fortune in the near future. We often hear of the miner that has made \$10,000 or \$15,000 in a short time, but little is said about the unfortunate man who loses a small fortune prospecting.

At Webb City and Carterville development and improvement have also kept pace with the times. Among the companies that have made improvement are the Center Creek Mining Co., Motley Mining Co., and also on the Tracy Lead & Zinc Co.'s land. There have been several new mines opened at Carthage during the past year, some of which are equipped with good machinery.

In Lawrence county there has been a great improvement in the output and in the number of new mines, but like Jasper county, it has almost as many men prospecting as there are in the so-called regular mines.

In my last year's report I called attention to the fact that the pillars in many of the mines in Southwest Missouri were being robbed by inexperienced mine foremen, or miners who were working for immediate profit, regardless of the future. While on a tour of inspection this year I found in Jasper county three valuable mines which had fallen in owing to the neglect of leaving sufficient pillars or properly timbering the ground. Two of these mines caved in under the machinery, which not only incurred the great expense of sinking new shafts, but obliged the companies to move and rebuild the plants.

Ventilating in many of these mines seems to be greatly neglected; companies allow their mines to lie idle for days at a time on account of bad air, waiting (as one of the men explained to me) "for it to rain to cool the air and improve the ventilation." In many cases which came under my notice the ventilation could have been improved and made comparatively good at a very small expense and a great saving in the end to the company, as well as giving better health to the miners. I have seen operators trying to ventilate their mines with a small "blow" fan, even where two mines were connected, when if they would erect a small furnace in one of the shafts a great deal of time and money would be saved, besides giving the mine better ventilation. The

small fans are sufficient in sinking or in driving headings, but after a mine is connected with another shaft I would suggest erecting a furnace, as often one-half or more of the air leaks through the canvas pipes before it reaches the workmen.

In my report of last year I made some suggestions to be referred to the Legislature at their next session, in regard to some needed changes in the mining law relating to the lead and zinc mines, which I trust will be carefully considered. There should be a law requiring all lead and zinc mine operators to cover their hoisting apparatus so as to protect the brake on drum from getting wet.

During the past year several narrow escapes from serious accidents have occurred by the brakes on drums being wet. Two years ago Messrs. Garrison lost their lives at Webb City from this cause. In no case should more than one person at a time be allowed to go up or down on a tub, especially on horse hoisters. Many lead and zinc miners are careless in the use of explosives. During the past year there have been three accidents from the careless handling of dynamite, one of which proved fatal. It is a common practice with many miners in preparing to load a shot to bite the exploder in order to make it stay onto the fuse. In speaking to one of the miners about this practice, he replied: "There is no danger; I have fastened many of them in this way." It is a very difficult matter to gather statistics in the lead and zinc districts of southwest Missouri. The usual reply to a request for information is: "We lease our land to mine operators; all we do is to collect royalty from them; therefore, if you want any information, you will have to see the mine operators, as we do not know anything about the mines;" but the number of sub-operators and the irregularity with which they work makes it difficult to obtain satisfactory statistics from them.

Some land owners and draining companies were very obliging and assisted me materially by giving me desired information, for which I thank them very much. Others did not seem disposed to give any more information than they could help. I will say, however, that there were only a few managers of this character with whom I came in contact.

SURVEYS OF MINES.

The law requiring mine operators to make and file maps or plans of their mines, in January of each year, with the clerk of the county court, in the county wherein such mines are located, and also file a copy with State Mine Inspector, does not seem to be understood by some of the mine operators. During the past year there have been 61 maps received at this office, 13 of which had to be returned to mine opera-

tors to be corrected, because they were not made in accordance with the mining law. I have received several maps from mine operators which had been marked out on brown paper with a lead pencil, with nothing to show where the mines are located, and made to no scale; such maps are of no use.

The evident intention of the Legislature was to have a complete record of all mines in the State in which more than ten men are employed kept on file for public inspection in this office, and also with the county clerk in the county wherein such mines may be located. Moreover, some mine operators who have filed maps with this office do not seem to understand the necessity of filing them with the county clerk.

An accurate map of mine will be found in the office of every well-regulated coal company, which is extended from time to time as the working face advances. I have received several letters during the year from county surveyors and mine superintendents, asking how a map of a mine should be made. To make a complete map, the engineer should first make a survey around the tract to be worked, locating all the prominent physical features and improvements, and make a topographical map of the tract; streams of water should be regarded as of primary importance, and should be located with exactness. After the surface survey has been made and platted, a survey should be carefully carried into the workings and same care taken as on the surface. Take advantage of the second outlet to carry the survey to the surface by a route different from that by which the mine was entered, and connect with the outside survey.

The mine map should be a ventilating chart, made on a scale of not more than 200 feet to the inch. Mark the up-cast and down-cast plainly, and show the air current by arrows.

With mine maps constructed in this manner, mines can be worked more economically, for if an entry is to be driven, the same can be located on the map; if a change is desired in the method of ventilating, it can readily be planned on the map; if there are any streams on the tract, they can be located and kept from finding their way to the inside workings of the mine.

RECORD OF INSPECTION.

(By counties.)

ADAIR.

Novinger, J. B.:

Owens and operates a small drift for local consumption; located near Stahl; coal is from 3 to 3½ feet thick; worked on the pillar and room plan; pays 4 cents per bushel for mining; 3 to 7 men are employed; mine idle at date of inspection.

Pennsylvania Coal Co.:

Mr. H. C. McCohan, superintendent, owns and operates a mine at Stahl, and has a lease on a mine at Danforth, which they are also operating; both of which are connected by switches with the Q. O. & K. C. R. R.

The mine at Stahl is a drift, ventilated by a small furnace; roof seems to stand better in rooms than it does on entries; the air appears to cause the roof to cut and break down in the entries and air courses, which is not the case in rooms.

Road-ways were wet and muddy, in fact the mine seemed to be neglected by its managers; coal is from 38 to 42 inches thick; worked pillar and room plan.

Mine at Danforth is a shaft 52 feet deep; steam power; ventilated by a small furnace which was removing 3,600 cubic feet of air per minute; but owing to so many old brattices, doors, etc., which were found to be leaking, the force of the air was not sufficient at the working faces. The company officials were duly notified of the fact, and requested to have the deficiency supplied at once.

I have no knowledge as to whether they have complied with my request or not, neither have I had any complaints from the miners there. With this exception, I found the mine in fair condition.

Coal is about 3½ feet in thickness, worked on the pillar and room plan; mine fairly well drained.

D. R. Pickens:

Owens and operates a small drift near Stahl; worked on the pillar and room plan. Coal is about 3½ feet thick. Employs 4 to 8 men.

AUDRAIN.

A seam of good bituminous coal is being worked in the eastern part of the county. The principal mine is located at Vandalia, owned and operated by the Vandalla Coal Co. This mine is equipped with good machinery, etc., for handling the product, but owing to the competition in Kansas City and other north and western markets, by the cheap coal from Rich Hill, Lexington and Bevier, they are confined to local demand along the C. & A. R. R. The coal is found from 20 to 100 feet below the surface, and is 24 to 36 inches thick, the general average being about 30 inches. A black slate forms the roof immediately over the coal, with a good fire-clay mining under it; therefore it is well adapted to the long-wall plan, which is generally used.

There is also one mine at Farber, and several located 8 to 10 miles south of Vandalia, which are operated by farmers and local operators for home consumption. The names of the mines and their condition are as follows;

Audrain Manufacturing, Coal & Mining Co.:

S. D. Ely, superintendent. Mine located at Vandalia; connected with the C. & A. R. R. by a switch. Steam power; shaft 62 feet deep; ventilated by a furnace. Mine was idle at date of inspection, therefore I did not see the miners at their work, but found the roadway to escapement shaft open and in good condition, having been opened since my last inspection. Coal is worked on long-wall plan.

Craig, John T.:

Owens and operates a mine near Mount Carmel; shaft 40 feet deep; horse power; coal about 32 inches thick; worked in fall and winter for local trade.

Detienne, O.:

Mine located near Mount Carmel; is a shaft 45 feet deep; horse power; coal about 3 feet thick; worked pillar and room plan.

This is a new mine, been in operation less than a year; coal is used for home consumption; employs from 2 to 5 men.

Lynch's mine:

Operated by John Howarth; mine located 4 miles southeast of Laddonia; shaft 37 feet deep; horse power; coal 32 inches thick; worked on the long-wall plan; ventilated by a small furnace; coal used for home consumption; employs from 2 to 6 men.

Stephens' mine:

Located 4 miles southeast of Laddonia; horse power; shaft 25 feet deep; ventilated by a small furnace; mine operated for home consumption.

Vandalia Coal Co.:

W. R. Williams, secretary; company owns and operates two mines in the county, one at Vandalia and the other at Farber.

The one at Vandalia is a shaft 65 feet deep; steam power; ventilated by a furnace; one brattice cloth on first west entry was found to be leaking nearly one-half of the air; I also found return air course partly closed by fall of slate. The attention of the mining boss was called to these deficiencies, and he said he would attend to them at once. As I have never had a complaint from the miners since, I have no doubt but that my request was complied with at once. The road to escapement shaft had been opened, but was not as large as the law requires; I therefore notified them of the fact, and requested them to make it the proper size.

Coal is 26 to 30 inches thick, and worked on the long-wall plan. Employs 45 to 50 men and boys. Roof good; mine well drained. July 1, 1889, miners went on a strike against a reduction from \$1.00 to 80 cents per ton for mining, which was compromised July 20, by the company paying 86 cents per ton.

The mine at Farber is a shaft 96 feet deep; horse power; has two openings; use fire in one of the shafts for ventilation when needed. Is only operated for local trade; employs 3 to 6 men.

BARTON.

The principal mining is done at Liberal and Minden. At the latter place coal is found 45 to 80 feet below the surface, and is 36 to 40 inches thick, but gets thinner as it extends east.

At Liberal the coal seam, which is about 28 inches in thickness, crops out around the brow of the hills several feet above the railroad track; therefore it is worked

by drift. A thin seam of coal is also worked by farmers and local operators around the city of Lamar, which is 11 to 18 inches in thickness, but is usually worked by stripping or quarries.

James Brookings:

Shaft located near Liberal, horse power; mine idle at date of inspection.

David Brookings:

Mine located near Liberal on the Walsler land; shaft 30 feet deep; horse power; employs four men.

Commercial Coal Co.:

Mine located 1. mile south of Liberal; connected with the Mo. P. R. R. by switch.

Mine was inspected February 26 and found to be fairly well ventilated; in one entry, however, the air did not reach the workmen in sufficient quantities. On calling the superintendent's attention to the matter, he said that he would have the same fixed at once, and in due time I received notice from him stating that my request had been complied with.

Mine was poorly drained; roadways were wet and muddy; coal is about 28 inches thick and worked pillar and room plan.

Charles H. Morgan:

Mine located near Minden. Thomas McCluskey, mine superintendent. Steam power; shaft 45 feet deep. Considerable improvement has been made at this mine during the past year. A new engine and boiler have been put in to take the place of the horse hoister, and the mine is much better drained. Ventilated by a small but fairly well constructed furnace, which was removing 8,250 cubic feet of air per minute; there was but a small fire in furnace at date of inspection (February 27), as the mine was idle. The first west entry on the south side was the only part of the mine where there seemed to be a deficiency in air; this was caused by the air course being obstructed by falls of slate. Coal is about 3 feet thick, worked on the pillar and room plan.

Pay for mining unscreened coal .57 per ton in summer and .70 in winter. Mine gives employment to about 100 men and boys.

Western Coal and Mining Company:

A splendid steam plant; located near Minden, but has not been in operation during the year.

A. B. Kirkwood:

Has just opened a mine at Minden. The coal was struck 40 feet below the surface; mine is equipped with a 10-foot ventilating fan.

BATES.

Coal is worked at Rich Hill, Foster, Worland, Sprague, Hume and several other places in the county. The most productive mines are located near the city of Rich Hill. Many strip pits or quarries are worked during the fall and winter in different parts of the county by farmers for local consumption, which are very hard to get reports from as to the amount of coal mined, without taking too much of our time, but we think, however, that most of the principal mines in this county are reported herein.

There are mines also being opened at Amoret by the Missouri Coal and Construction Company, Mr. L. J. Burch superintendent.

The company is now sinking one shaft, which is down several feet; they expect to strike a 57-inch seam of coal at a depth of 33 feet, and promise to do a fair coal business in the near future. They also have twenty miners' houses under way of construction.

Keith & Perry Coal Co.:

Owens and operates two mines, located near Rich Hill, connected with the K. C., Ft. S. & M. R. R. by a switch. G. R. Sweeney is superintendent and John Perry general manager.

Mine No. 5 is a steam plant, located $4\frac{1}{2}$ miles northwest of Rich Hill; shaft 70 feet deep, employing 100 men and boys in and about the mine.

The mine is ventilated by a 14-foot fan, which was making about 58 revolutions per minute and discharging 24,400 cubic feet of air in the same time. It was taking air from three different air shafts; each inlet or air current ventilated separate groups of men in different parts of the mine. The air was found to be inadequate at the head of one of the entries on north side of shaft; this was caused by the great distance the air had to travel before reaching the miners in head of entry. I called the attention of the mining boss, Mr. Mackiel, to the fact. He said he would open a brattice and close off one part of the mine which was not being worked, thereby lessening the distance several hundred feet that the air would have to travel, which undoubtedly will better the ventilation in the mine.

As I have never had any complaints from the mine, I have no doubt but that the deficiency was remedied. With this exception I found mine in good condition. Coal is 4 to 6 feet in thickness; worked pillar and room plan; pay for mining 50c per ton, run of mine or unscreened coal.

Mine No. 6—Located 5 miles northwest of Rich Hill, and adjoins No. 5 on the west, is a shaft 250 feet deep, equipped with good machinery, etc. Mine was inspected September 26, December 12, February 24 and March 31, and found to be in fair condition on each inspection.

I received notice September 26 that one Robert Carter (colored) had been burned in this mine, which led to an examination. On making a careful inspection of the mine and examining several witnesses, I found that Mr. Robert Carter was burned by an explosion of fire-damp which had accumulated in an old abandoned room near the room in which he was working.

It seems from the evidence collected that Mr. Carter had gone into this old abandoned room for some unknown purpose, against the rules of the company, and his open light ignited the gas, which burned him in such a manner that he died from the effects on the 28th. According to the sworn statement of Mr. Patterson Harding, mine boss, and W. R. Metz, shot-firer, they did not know there was any gas in the room. After making a careful examination, I failed to find any gas in any part of the mine.

February 24 the mine was again inspected and found to be in fair condition. The measurement of air was taken about 350 feet from the bottom of the shaft, which was 12,800 cubic feet per minute, which was being forced and circulated around the mine in sufficient quantities to remove all noxious gases. At that date there were 67 men and boys employed in and about the mine.

March 30 I visited the mine again, in response to a notice from the superintendent stating that two men had been burned on the night of the 25th. After making an examination I found that N. Berrang and E. T. Metz had been burned by what is known as a windy shot.

Mr. Metz and Mr. Tom Brown were employed by the company to fire shots at night. Mr. Berrang was not an employe of the company, but had gone in as a

visitor. According to their sworn statement they had fired all the shots in the mine with the exception of seven, which were located in three different rooms near the head of what is known as the first north entry on the hill, on east side of shaft. These seven shots were all lit together. The men had got about 250 feet away from them when they commenced to fire. The flames from the shots swept over them, which burned Mr. N. Berrang and E. F. Metz. Mr. Brown fell down upon his face and thereby escaped the fire. Messrs Berrang and Metz were off work two or three weeks.

After making a thorough examination of the mine, I am of the opinion that two or more of these shafts were discharged at the same time, and as this part of the mine is extra dry and dusty, is probably the cause of the fire traveling the great distance it did.

Air measurement was 14,100 cubic feet per minute and about 64 men employed. Coal is from $3\frac{1}{2}$ to 6 feet thick; worked pillar and room plan.

Since the above was written, the company has abandoned mine No. 5, and are now sinking a shaft 2 miles south of Rich Hill.

Lucas, W. W.:

Drift, located 1 mile north of Rich Hill; mine was idle date of inspection and had been for several days; therefore I did not think it necessary to make an inspection, as they were unable to tell me when the mine would be put in operation again.

Use furnace to ventilate mine; coal from 5 to 6 feet thick; work on the pillar and room plan.

Powers, James:

Mine located at Shobe, is a slope; coal from 4 to $4\frac{1}{2}$ feet thick; worked pillar and room plan; mine fairly well drained and in good condition.

Use a small furnace to ventilate with.

Raney & Co.:

Is operating a small drift located near Worland; coal 3 feet thick; worked pillar and room plan; mine in fair condition; pay for mining 65 cents per ton for clean coal; employs from 4 to 7 men.

Rich Hill Coal Mining Co.:

Major R. M. McDowell, vice-president and general manager. J. T. Reavley, superintendent. General office St. Louis, Mo.

Mines located near Rich Hill, Mo., all of which are connected with the Mo. P. R. R. by switches.

Coal is from $3\frac{1}{2}$ to 6 feet in thickness; worked on pillar and room plan.

Pay for mining unscreened coal $51\frac{1}{2}$ cents per ton, and clean merchantable coal about 70 cents per ton.

Mine No. 2—steam power; shaft 32 feet deep; ventilated by a 10-foot fan, which was removing 19,650 cubic feet of air per minute, measured at the outlet near the fan; the measurement was also taken 1,600 feet from the fan, and near the head of main entry, which was about 17,000 cubic feet per minute, a loss of only 2,650 feet by leakage in traveling 1,600 feet. In making an inspection of this mine last year the same measurements were taken, as follows: Near the fan the air meter registered 17,500 cubic feet per minute, and near the head of main entry only 5,400 cubic feet were passing, showing a loss of 12,100 cubic feet of air per minute. From these figures we are able to say that there has been a big improvement in the ventilation of this mine during the last year.

An extra escapement shaft has been sunk during the last year which is in good condition.

There were about 95 men and boys employed in and about the mine.

General condition of mine good. George Maylen is mine boss.

Mine No. 3 located 3 miles northwest of Rich Hill; J. B. Watson, mine boss; mine is operated by John T. Weathers, contractor.

The coal is brought to the surface from two slopes, one to the east and the other to the west of engine house; machinery for hoisting, etc., in fair condition. The west side slope is ventilated by an 8-foot fan and the east side by a 10-foot fan, both of which were giving good results.

From 50 to 65 men are employed in and about the mine.

Mine No. 4:

Operated by Thomas Graham. James Robertson, mine boss. Mine located 2½ miles northwest of Rich Hill. Is a slope; steam power; ventilated by a 7-foot fan, which was removing 6,480 cubic feet of air per minute.

Roadways fair, but drainage in part of the mine was poor; this was caused by some of the rooms and entries going to the dip.

There were about 42 men and boys employed in and about the mine at date of inspection (February 20.)

I visited mine March 31, and made an examination of the accident in which Charles Robertson, a 14-year-old boy, lost his right leg just below the knee, on the 22d day of March.

From the evidence collected, it seems that Charles Robertson had been employed by the operator to cage the coal at bottom of slope; "that is, it was his duty to take the rope from the empty trip and fasten it to the loaded cars, and ring the bell for the engineer to hoist;" while at his work on the morning of March 22, an empty car got loose from the top and ran down the hill, catching him between the cars with the result as stated. This accident might have been avoided if there had been "latches," or something at top of slope to prevent the cars from getting loose. The deficiency has been fixed since the accident.

Mine No. 13:

Located 4½ miles northwest of Rich Hill; John Graham, mine boss.

Shaft 60 feet deep; machinery, etc., good. Mine was inspected February 21 and May 26. It is ventilated by a 10-foot fan, which was removing over 30,000 cubic feet of air per minute on first inspection (February 21), with about 185 miners and 35 day men employed.

Second inspection the fan was removing 27,300 cubic feet of air per minute, and about 160 miners and 30 day men and boys employed. But even with this amount of air passing through the mine, the smoke from the shots, which are fired at noon, is not entirely cleared out of all parts of it for quite a while after the miners who are working on the last of the air return to their work at 1 o'clock. (There are from 25 to 40 kegs of powder burned in this mine every day it is in operation.)

Mine fairly drained; roof and roadways good; coal from 3 to 6 feet thick; worked pillar and room plan.

Mine No. 14:

Is a steam plant; located 5 miles northwest of Rich Hill; shaft 250 feet deep. Alex. McKinnon, mine boss. Mine ventilated by a 15-foot fan; at date of inspection there were 19,600 cubic feet of air passing through the mine per minute, and about 50 men employed. The air was being forced and circulated to all parts of

the mine in sufficient quantities to remove all noxious gases. It was in this mine where the fire occurred last year, which caused the company a loss of over \$12,000.

Coal is from 3 to 5 feet thick; worked on pillar and room plan; mine well drained.

The following three mines are also upon the company's land, but operated by contractors as follows:

W. F. Hudson:

Drift; employs from 6 to 14 men; coal 3 to 4½ feet thick, and worked pillar and room plan.

Simeon Jay:

Drift; ventilated by a small furnace; employs from 6 to 15 men in and about the mine.

F. M. Martin:

Drift; employs 8 to 12 men; coal worked on pillar and room plan.

Mines Nos. 1 and 5 were worked out and abandoned during the last year.

Sharks, John:

Is operating a mine near Worland, on the Allen land. Is a drift, employing from 3 to 4 men; coal is about 3 feet thick; worked pillar and room plan.

Spencer, O.:

Is operating a drift and strip-pits near Rich Hill; coal is from 3 to 4½ feet in thickness; mine is worked pillar and room plan.

Wise (J. M.) Coal Co.:

Is a slope, located 2 miles northwest of Rich Hill; ventilated by a small furnace, which was giving good results. Coal is from 3½ to 5 feet thick, worked on the pillar and room plan; pay 51½ cents per ton for mining "run of mine" or unscreened coal. At this date (Feb. 19) there are 25 men and boys employed in and about the mine.

Western Coal and Mining Co.:

Mr. M. A. Greenleaf, superintendent. Company owns about 2,400 acres of coal land lying in the vicinity of Foster and Worland; a great deal of the coal is found near the surface, therefore it is worked by strip-pits; there are, however, two mines located near Worland which are worked by slopes, that are reported hereafter. Coal is from 32 to 38 inches in thickness.

Mine No. 1:

Operated by John Wilkins. Is a slope, ventilated by a small furnace; the air was not being conducted around the mine properly, caused by the boss neglecting to put brattice cloths over the mouths of rooms; with this exception I found the mine in good condition. Employs 16 men in and about the mine.

Mine No. 2:

Is operated by Messrs. Delapp & Rankin. Slope located at Worland; ventilated by a small but well-constructed furnace, which was giving good results; there were 12 men employed at date of inspection (March 12); mine is worked pillar and room plan.

BOONE.

Coal is being worked in several different townships in this county. It probably reaches its greatest thickness in township 49, range 13. Here it is found in places in the Gooding mine, nearly 4 feet; but the general average is not above 36 or 38 inches. In township 49, range 12, there are several small mines, most of which are drifts, located along the banks of Hinkson creek, which flows through the southeastern part of the township.

The Columbia Coal Co.:

Mine in this township, on section 21. The coal lies in gradual rolls or swells, with an average thickness of about 3 feet.

There are also several mines located from 3 to 4 miles southeast of Hallsville, which are worked in fall and winter for home consumption.

Benefiel, Ben S.:

Drift, located $3\frac{1}{2}$ miles northeast of Columbia. Coal is about 3 feet thick, and worked on pillar and room plan, employing from 2 to 6 men.

Columbia Coal Co.:

A. Rees, mine superintendent. Mine located 5 miles northeast of Columbia; connected with the Columbia branch of the Wabash railroad. Shaft 100 feet deep; horse power; ventilated by a basket of fire used as a furnace, which was removing 2,340 cubic feet of air per minute, but the air was not being properly conducted around the mine; doors, brattice cloth, etc., were leaking in several places. The mine superintendent's attention was called to these deficiencies, and requested to repair them at once. I have no knowledge as to whether they have complied with my request or not, neither have I had any complaint from the miners of this mine.

Coal is from 34 to 38 inches in thickness; worked on the pillar and room plan; employs from 25 to 34 men and boys in and about the mine.

Gooding, W. A. & Co.:

Postoffice, Columbia; mine located 4 miles north of Columbia; E. Morgan, mining boss.

Shaft 57 feet deep; horse power; ventilated by a small furnace. At this date (June 20) there are only 4 miners employed; but in winter from 25 to 30 are usually employed. Mine is well drained and in good condition. Coal is from 3 to $3\frac{1}{2}$ feet thick, with a good roof over it.

Kurtz, D. W. B.:

Mine located $2\frac{1}{2}$ miles northeast of Columbia; is a drift; coal from 34 to 36 in. thick; worked pillar and room plan.

CALDWELL.

Caldwell Coal Co.:

Postoffice, Hamilton. Mine closed down in March, and has not been operated since.

Hamilton Coal Co.:

W. H. Hines, secretary, Joseph McCourt, mining boss.

Mine located $1\frac{1}{2}$ miles south of Hamilton, connected with the H. & St. Joe R. R. by a switch. Coal is brought to the surface through a vertical shaft 300 feet deep. The machinery for hoisting, as well as cages and safety catches, etc., are in good

condition; ventilated by a 10-fan. Mine was idle date of inspection (June 7), making some repairs on the machinery, therefore I did not make an examination of it. Coal is from 15 to 24 inches thick, and is paid for mining from $3\frac{1}{2}$ to 6 cents per bushel, according to the thickness of seam, and is worked on the long-wall plan.

CLAY.

Randolph Coal and Gas Co.:

E. L. Martin, president, and Joseph Hann, superintendent; mine located at Randolph, with general office at Kansas City. Shaft 420 feet deep; machinery for hoisting in good condition; ventilated by a 12-foot fan, which was removing 7,920 cubic feet of air per minute, which was being forced and circulated around the mine.

Company has had considerable trouble with their men during the last year in establishing the price of mining. When the miners were first put to work by the bushel they received 9 cents per bushel for mining—company having the brushing done on their roadways. March 1, company cut the price to 6 cents per bushel, and required the miners to do their own brushing; miners struck against the reduction, and were out one week, after which they accepted the reduction and returned to work. May 1st, company again cut the price of mining—this time to $4\frac{1}{2}$ cents per bushel. Miners again struck against the reduction, and after a strike of three weeks the trouble was compromised by the company paying 5 cents per bushel.

Coal worked on the long-wall plan, and is about 18 inches thick. Employs about 40 to 45 men and boys in and about the mine.

CALLAWAY.

Most of this county is underlaid with a fair seam of bituminous coal, as shown by the different places in which it has been and is now being worked. The most extensive mining is being done in the Fulton township, around the city of Fulton, which city consumes in her mills, factories, etc., most of the product.

In the summer season, while there is but little demand for the coal, the miners can be seen working in gardens, factories, brick-yards, etc., until the coal trade opens up in the fall, at which time they are anxious to get back into the mines to escape the cold weather.

The roof overlying the coal in the Fulton township is poor; immediately over the coal there are several feet of slate which is very rotten, therefore it requires a great deal of timbering in entries, air courses and rooms to keep them secure.

Coal has also been worked for home consumption in township 46, range 10, and in township 49, range 11. There is said to be a pocket of bituminous coal in Cote Sans Dessein township which is 70 or 80 feet thick, but has not been worked for several years.

Bishop, R. L.:

Is operating a mine on Edwin Curd's land, near Fulton. Horse power; shaft is 24 feet deep; coal is from 28 to 33 inches thick and worked on the long-wall plan.

Employs from 3 to 10 men.

Castle, Wm.:

Is opening a mine near Fulton for local trade. Employs 3 men.

Harris, John:

Owens and operates in fall and winter a mine located $\frac{3}{4}$ of a mile west of Fulton. Shaft 40 feet deep; horse power; coal is from 18 to 36 inches thick, with a general average of about 30 inches; worked on the long-wall plan.

From 8 to 10 men are employed in fall and winter.

Harris, A. & Co.:

Operating a mine located $1\frac{1}{2}$ miles west of Fulton, connected with the C. & A. R. R. by a switch. Shaft 55 feet deep; horse power; ventilated by a basket of fire. Air was poor at head of some of the rooms, which was caused by small places in air course and leakages in brattices, etc.; but the mining boss was cleaning up an entry near the air shaft preparatory to changing the miners—who were working in the poorly ventilated rooms—into it, which will undoubtedly give them good air. Roof poor; requires considerable timbering in entries, air courses and rooms to keep it secure.

Coal is about 30 inches thick, worked on the long-wall plan.

Pay 4 cents per bushel for mining. From 6 to 12 men are employed.

Lehman, R.:

Drift; located $1\frac{1}{2}$ miles northwest of Fulton; employs from 2 to 6 men.

Maycock, Sarah:

Drift; located 2 miles northwest of Fulton; employs from 7 to 8 hands in fall and winter; coal worked on the long-wall plan.

Maycock, Samuel:

Is operating a mine on Smith's land; drift; ventilated by a small furnace, which also ventilates Smith's mine. Coal is about 30 inches in thickness and is worked on the long-wall plan. Only a few men are employed in fall and winter.

Metcalf, John:

Postoffice, Stephens' Store. Slope; employs 2 men in fall and winter; coal is about $2\frac{1}{2}$ feet in thickness.

Smith, James:

Owens and operates a mine located about $\frac{1}{2}$ mile west of Fulton; coal is about 30 inches thick, and worked on the long-wall plan; ventilated by a small furnace; employs from 2 to 16 men and boys; roof is of a very soft nature, requiring an extra amount of timbering.

Thorp & James:

Operate a mine on Bellman land, located $2\frac{1}{2}$ miles northwest of Fulton; drift; employs from 3 to 5 men; coal about 30 inches thick; worked on the long-wall plan.

CRAWFORD.**Cherry Valley mines:**

Operated by the Meramec Iron Mining Co., Capt. E. T. Herndon, general manager. Mines located 6 miles southeast of Midland blast furnace; connected with the Frisco railroad by a switch. The ore is found in deposits; the deposit which is now being worked is about 425 feet long by 375 feet wide, and has been worked to a depth of 100 feet; nearly half a million tons of ore have been taken out of this deposit. Miners' wages average \$1.20 per day. The superintendent informed me that they have not had a strike during the eleven years they have been operating these mines.

GREENE.

There were seven land companies operating mines in this county during the last year, located at Ash Grove and at Mumford on the James river. Some of these

companies or land owners lease their land to operators, who pay the land owner a royalty on all mineral mined. Following are the operators, with character of mines. Date of inspection, August, 1890.

Eversol & Eaton, P. O. Mumford :

Are putting in machinery on the Kershner land, preparatory to mining. Some mining was done upon the land last fall, but nothing has been done since until this company commenced operations this summer ; 4 men are employed.

Duncan land, P. O. Ash Grove :

The mine on this land has not been worked since last fall. I understand that it is now in litigation. Mine was leased to Raymond & Co., but operated by Steen & Co., of Ft. Scott, Kansas.

Götz land :

Mines located $1\frac{1}{2}$ miles southeast of Ash Grove. Mining has only been done for surface ores ; at this date there are two shafts being sunk, employing 4 men.

James River mines :

Operated by John E. Phelps & Co. Postoffice Greenfield. Mines are located on the James river, near Mumford. Shaft 135 feet deep, but working at 27 feet ; horse power ; employs 6 men in and about the mine ; mine is well ventilated and in good condition.

McCord (Dr. T. J.) land :

Located near Ash Grove. The land is leased in lots to operators, who put in machinery and work the land to suit themselves, paying the land owner royalty.

The most productive mine, which was operated by Taylor, Edgington & Co., is idle. At this date, August, 1890, there are two shafts being operated, both of which are taking out some ore, employing 5 men.

Harvey Murray's land :

Located $1\frac{1}{2}$ miles southeast of Ash Grove. The land is leased in lots 200 feet square to operators who pay the land owner royalty. The following 4 mines are in operation upon the land at this date (August, 1890), besides several prospect shafts, that give employment to 10 or 12 men :

Golden Eagle Co. :

Shaft 73 feet deep ; horse power ; employs 3 miners and 3 top men ; mine has been in operation only a short time ; J. C. Hayden is superintendent.

Nixon & Murray. :

Shaft 80 feet deep ; horse power ; employs 2 miners and 1 top man.

Terrapin mine :

Shaft 70 feet deep ; horse power ; employs 2 miners and 1 outside man.

Yellowhammer mine :

Shaft 73 feet deep ; horse power ; employs 3 miners and 2 top men. The principal product is lead.

Pearson Creek mines :

Operated by J. B. Sherman & Co. Mines located near Mumford, on Pearson creek ; postoffice address is Springfield, Mo.

Ore is mined in 2 shafts. No. 1 is a steam power ; shaft 30 feet deep, employing 4 miners and 6 men outside ; 1 steam pump is used. No. 2, horse power ; shaft 22 feet deep ; 4 men are usually employed.

GRUNDY.

Grundy County Coal Co.:

Mine located at Trenton. N. Shanklin, superintendent. Is a steam plant; shaft 210 feet deep; ventilated by an 8-foot fan, which was only removing 5,280 cubic feet of air per minute. On making an examination it was found that the up-cast or ventilating shaft was only about 9 feet in area. I therefore notified the superintendent that it was impossible for his fan to give good results under the circumstances; he said they were going to erect a fan at the escapement shaft as soon as possible. In a letter to me dated July 8, '90, he says: "We have put in a fan at escapement shaft; use it as a blower or down-cast; it proves entirely successful; we have the best air we have ever had." As I have had no complaints from the miners of this mine, I have no doubt that the mine is now fairly well ventilated. Roof is good; mine well drained; coal averages 17 inches in thickness, and is worked on the long-wall plan. From 85 to 100 men and boys are employed in and about the mine.

HENRY.

Coal is being mined at Calhoun, Lewis station, Clinton, Brownington, Deepwater, North and Hartwell; but the most productive mine is located at Deepwater, operated by Keith & Perry Coal Co.

The operators at Calhoun and Lewis station ship their coal to towns along the line of the M., K. & T. R. R. A great deal of the coal is also used by the railroad company.

Coal from Deepwater and North is shipped over the Kansas City, Ft. Scott & Memphis R. R. to Kansas City, Kansas, and to Nebraska.

The coal that is mined in the vicinity of Clinton is mostly used in that city.

Mines which were inspected in this county during the last year are as follows:

Baldwin & Fonda Coal Co.:

John Gidney, superintendent. Mine located 2 miles west of Calhoun; connected with the M., K. & T. R. R. by a switch.

Steam plant; shaft 51 feet deep; machinery fair, tip-house good. March 4, I visited and made a careful examination of all parts of the mine, and found the return airway so small in light places that it was with difficulty that we managed to crawl through them. Air measurement was less than 600 cubic feet per minute. They had also allowed the escapement road to fall in. I therefore gave them a written notice, requiring them to furnish the amount of air in mine required under section 7064 R. S., which requires 100 cubic feet of air per man per minute, measured at the foot of the down-cast, which shall be forced and circulated to the face of each working place throughout the mine.

March 11, I again visited and made an inspection of the mine, and found that the company had cleaned up the roadway to escapement shaft, but had done nothing to improve the ventilation. There was not enough air passing through the mine to run the anemometer. It seems that the superintendent of this mine depended a great deal on nature for ventilation.

After making this inspection, I immediately—through the prosecuting attorney of Henry county—entered criminal prosecution against the company for violating section 7064, R. S. The case was called May 23, before Judge DeArmond.

Defendant claimed that no statement had been made as to the amount of air that should have been circulating through the mine, therefore, they were guilty of

no crime under this charge; which was sustained by the court; although in section 7064, R. S., of the mining law, it is expressly stated that ventilation must be at the rate of 100 cubic feet per man per minute.

Blair Diamond Mine :

Operated by Thomas Coe & Co. Mine located $1\frac{1}{2}$ miles west of Brownington; connected with the Kansas City & Southern railway by a switch.

Mine No. 2--Steam power; shaft, 70 feet deep; ventilated by a 10-foot fan, which was, on first inspection (March 6), removing 5,775 cubic feet of air per minute, but the air was mostly lost before reaching the miners, by leaking through doors, brattices, etc. The mine boss, Thomas Coe, was instructed to clean out air courses and to repair doors and brattices that were leaking, at once. In due time I received notice stating that my request had been complied with.

July 26 a letter from Mr. S. S. Wilson, a miner who had been employed by this company, was referred to me by the Labor Commissioner. The letter had been written to the Governor, and stated that the Mine Inspector was needed at this mine, as the air was bad.

August 7 I visited and made an examination of the mine and found it fairly well ventilated. I also found that this Mr. Wilson had been discharged by the company July 10, 13 days before he wrote to the Governor complaining about the air. The room in which he worked prior to the time he was discharged was on the first of the air. A door was hung near the mouth of his room, which forced the whole volume of air up through his room and through the break into the next room. Mr. Robert Mills states, "I was working with Mr. S. S. Wilson in this room before he was discharged, and air was as it is now—good; I think Mr. Wilson must have complained because the company had discharged him." The mine boss said Mr. Wilson was discharged because he refused to push his coal out to the mouth of his room, which was the custom in this mine. After making a thorough examination of the mine, and talking with several of the miners, I am of the opinion that Mr. Wilson had no reason to complain about the air, as the whole volume of air was passing through the room in which he had been working, before reaching the other workmen. Mine makes considerable water; coal is about 3 feet thick; worked pillar and room plan; pay 85 cents per ton for mining in summer and 95 cents in winter, but miners are expected to clean the coal before sending it out; from 40 to 50 men and boys are employed in and about the mine. Mine No. 1 was not in operation at date of inspection. Since the above was written the company has completed a new air shaft.

Wm. Bush :

Mine located near Deepwater; shaft 30 feet deep; horse power; coal is worked pillar and room plan, and is about 30 inches thick.

Co-operative Coal Co.:

Which was located at Lewis station, was worked out and abandoned February 14, 1890; but I understand the company is opening a new mine at that place.

Devereaux & Thompson :

Are operating a mine on R. Garland's land; located $2\frac{1}{2}$ miles south of Deepwater; is worked by a slope; coal 3 feet thick. Mine is new.

Fairview Coal Mine :

Owned and operated by Mr. H. T. Noble; located $1\frac{1}{2}$ miles west of North post-office; shaft 65 feet deep; horse power; coal is from 34 to 37 inches thick; works on the pillar and room plan; employs from 8 to 10 men and boys.

Hagman & Eaton:

Mines located about 3 miles south of Deepwater. Coal is worked by a slope and shaft; the shaft is 45 feet deep; horse power. Coal is about 3 feet thick, and gives employment to from 16 to 40 men; coal is hauled to railroad track, a distance of $3\frac{1}{2}$ miles, in wagons. Slope was in good condition at date of inspection, March 7. Shaft has been opened since the inspection was made.

Hobbs & White:

Postoffice, Deepwater; operate a slope; 3 men employed.

Hurst, John:

Operating a mine at Hartwell; shaft 30 feet deep; horse power; coal about 30 inches thick; from 4 to 9 men are employed.

Kay Coal Co.:

Mine located 3 miles southeast of Deepwater; is a drift; coal 3 feet thick; worked on pillar and room plan; employs from 2 to 10 men.

Keith & Perry Coal Co.:

John Perry, general manager; John Paterson, superintendent, and Robert Barr mine boss. Mine located near Deepwater; general office Kansas City, Mo.

Is a shaft 65 feet deep; steam power. Mine has been inspected twice during the year, on March 7th and August 8th, and has been found in very good condition each time. It is ventilated by a 10-foot fan, which was removing 10,900 cubic feet of air per minute; the air is split on the bottom of hoisting shaft, which is the inlet; one part of it is conducted to the east and northeast side of the shaft, and around the working face and then back the air course to the outlet; the other part to the south of mine, and is conveyed around the face in the same manner as it is on the east side. One trouble arises in the ventilating of this mine, which is worked on the long-wall plan; that is, a shot is occasionally located in such a manner that when it is discharged it fills the air course full of coal, thereby blocking the current in that part of the mine until it can be cleaned out.

Roof and roadways good; mine well drained; coal averages about 28 inches in thickness. From 100 to 135 men and boys are employed in and about the mine.

McFadden, James:

Mine located 3 miles southeast of Deepwater; is a drift; employs 2 to 5 men.

Owen, B. L.:

Mine located near Clinton; is a shaft 25 feet deep; horse power; mine is operated in fall and winter for local consumption; coal is about 2 feet thick, and is worked pillar and room plan.

Pigg D. B. Coal & M. Co.:

Mine located near Lewis station. Is a drift; ventilated by a small furnace; mine was idle at date of inspection (March 4) and as they did not know when they would start to work again, I did not deem it necessary to make a thorough inspection of the inside workings; mine was opened last fall, and is worked on the long-wall plan; coal is about 30 inches thick.

Tebo Coal Co.:

R. Bowen, superintendent. Mine located $1\frac{1}{2}$ miles east of Lewis station; is a steam plant; shaft 28 feet deep; mine was inspected March 4 and found to be fairly

well ventilated but poorly drained ; coal is from 26 to 30 inches thick, and worked on the long-wall plan. The mine was opened last August, therefore it is not very extensive.

Wood & North :

Mine located near North postoffice ; connected with the Kansas City, Ft. Scott & Memphis railway by a switch ; is a steam plant ; shaft 49 feet deep ; ventilated by a small furnace, which was not giving good results ; air was poor in south side of mine ; in some places the air was not being properly conducted around to the workmen ; company was duly notified to have the mine ventilated according to the requirements of the law, but I do not yet know whether they have complied with this request.

The mine was first opened on the pillar and room plan, but afterward changed into long wall, which did not prove a success on account of so much water leaking through the breaks in the roof, so the work was changed back to pillar and room in April. Coal is about 22 inches thick ; from 24 to 35 men and boys are employed.

Since the above was written the company has commenced to sink a new shaft near the head of south entry, which, when complete, will undoubtedly give good ventilation and put the mine in fair condition.

HOWARD.

George Bain & Co.:

Mine located at Russell, postoffice Higbee, Randolph county ; is a slope ; coal from 3 to 3½ feet thick ; worked on the pillar and room plan. Roof poor ; employs 6 men ; mine was poorly ventilated at date of inspection, as there was no fire in furnace.

IRON.

St. Louis Ore and Steel Co.:

G. W. Crain, superintendent ; mines located at Pilot Knob ; general office at St. Louis, Mo.

The ore was found at Pilot Knob in 1847, and was for several years hauled to the Mississippi river in wagons and shipped to market by water, until the Iron Mountain railroad was built in 1858. The ore was, until a few years ago, smelted at the mines with charcoal, but is now shipped to St. Louis, Corondelet and other points near the coal fields to be smelted.

Company owns from 35,000 to 40,000 acres of land in this and adjoining counties.

The ore which is now being worked is found near the top of the mountain and is worked by open quarries ; about 100 men are employed.

The company collects 50 cents per month from each employe, which is kept by them for the care of the unfortunate employes who are sick or hurt. I heard no complaints from the men about this rule. Mr Crain, the superintendent, said they had never had a strike. Wages are from \$1.25 to \$1.75 per day.

JASPER.

CARTHAGE P. O.

Globe Mining and Milling Co.:

J. M. McCord, superintendent ; mine located 5 miles southeast of Carthage ; has been opened about two years, but has only been producing ore during the past year ; is a steam plant ; shaft 138 feet deep ; equipped with 1 pump and crusher ; employing 6 hands.

Herrin & Myers:

Mine located on the Missouri Pacific railroad's land, near the depot; is a steam plant; shaft 135 feet deep; one steam pump is in operation; there are 7 miners and 9 top men employed at this date (July 26).

Hubb & Puckett:

Mine located near Missouri Pacific railroad depot; shaft 165 feet deep; steam power; employing 4 miners and 6 top men; mine produces both lead and zinc.

Little Jersey Lead & Zinc Co.:

R. P. Shackelford, general manager. Mines located 3 miles southwest of Carthage. The mines were formerly operated by the Carthage Lead & Zinc Co., but were bought by this company last March, since which time they have been operating them.

One of the mines caved in last January, and it was idle until this company took charge in March; they have opened a new mine, which has at this date (July) good paying ore, but is not properly ventilated, the ventilating fan being too small, but machinery good; shaft is 100 feet deep; employs miners, 10; top men, 12. They are sinking another shaft which is well timbered and in good shape; 3 pumps, 2 sets rolls, 1 crusher and 2 sets jigs are in use.

Myers & Jennison:

Mine located near Mo. P. R. R. depot at Carthage. Steam power; shaft 140 feet deep; company is putting in some good machinery for crushing and washing the ore; mine is worked both night and day, giving employment to 12 miners and 18 other employes at this date, July 26, 1890.

Porter Mining Co.:

Mr. J. J. Burch, superintendent. Mines located near Mo. P. R. R. Depot at Carthage. Operating two shafts, both steam power; each shaft is about 110 feet deep. One of the shafts is equipped with a good cage, with safety catches for hoisting out of or lowering persons into mine, which was in good condition at date of inspection.

The mine was in fair condition, but owing to the soft nature of the roof, it requires a great deal of timbering.

Machinery for crushing and washing the ore consists of 1 crusher, 1 set rolls and 2 sets jigs; there are also 2 pumps used to drain the mines and furnish water to wash the ore; 14 miners and 24 other employes were employed at date of inspection (July 26.)

CARTERVILLE.**Daugherty, Davey & Daugherty:**

J. H. Daugherty, superintendent. Mines located at Carterville. Company leases land in lots 200 feet square to operators who sink shafts and work mines, paying the company royalty on all ores mined; the company also drains the mines, for which they charge additional royalty; 2 pumps are in use.

For table of operators, with character of mines at date of inspection (July 22, 1890), see page 44.

Davey, Tower & Co.—Tower, Davey & Co.:

Mines located at Carterville; land is leased to operators in lots 200 feet square. Company also drains the land with two large pumps, for which additional royalty is charged.

For table of operators, with character of mines at date of inspection (July, 1890), see page 45.

Jasper County Mine Operating Co.:

J. W. Grounds, superintendent; mines located $1\frac{1}{2}$ miles southeast of Carterville; shaft 157 feet deep; steam power; employs 13 miners and 10 top men, 1 crusher, 2 sets rolls, 1 set jigs and 3 pumps.

Following three mines were in operation upon the land at date of inspection, July, 1890:

Cannon & Co.:

Shaft 134 feet deep; steam power; employ 5 miners and 6 top men.

Gothrup Bros.:

Horse power; shaft 128 feet deep; 1 crusher, 1 set rolls and 1 set jigs, giving employment to 4 miners and 4 day hands on top.

Manley & Co.:

Shaft 156 feet deep; steam power; employ 4 miners and 2 top men.

Motley Mining Co.:

J. W. Chatman, superintendent. Mines located near Carterville. Mine was not in operation at date of inspection (July 26, '90), having closed down in June to make some valuable improvements. When it is put into operation again—which will be about the middle of August—it will be equipped with a larger engine, two crushers, three sets of rolls, five sets jigs and three pumps. They are also putting in a cage at one of the shafts to take the place of the bucket, which is a much needed improvement.

The ore will be brought to the surface through two vertical shafts, each of which is 150 feet deep; both are steam power. This mine gives employment to about 28 miners and 28 other employees when in operation:

Wages at this mine average: Miners, \$1.75; men who feed crushers, \$1.75; cull hands, \$1.75; washers, from \$2.00 to \$2.50; men who sink shafts, \$2.50 per day.

JOPLIN P. O.

Davis, Moore & Springs:

On the Porter land. A. C. Springs, secretary. But little work has been done upon the land during the last six months. There is at this date (July, 1890) one shaft in operation, which is 103 feet deep; horse power, employing 3 miners, 4 top men and one pump. There are also three prospect shafts being sunk upon the land.

Diamond Lead & Zinc Co.:

E. J. Holman, superintendent. Mine located 2 miles south of Joplin. Company bought mining privilege on 23 acres of land, for which, I understand, they paid Mr. A. F. Frye \$50,000. The ore was first struck on this land January, 1890, and at this date (July, 1890) there are 6 mines producing ore, besides several prospect shafts. Two of the mines are being operated by the company, the others by sub-operators, who pay the company 20 per cent royalty; sub-operators are also required to do their own pumping.

For table of operators, with character of mines at date of inspection (July, 1890), see p. 45.

Empire Zinc Co.:

W. C. Wetherill, general manager, Capt. Daniel Dwyre, superintendent; mines located 2 miles south of Joplin. Land is laid out in lots 200 feet square, a part of

which is leased to operators, who pay the company 20 per cent royalty on all ores mined, but the mine operator is expected to do his own pumping. Where the company drains the mines, an additional royalty of 5 per cent is charged.

Company's dressing works consist of an engine, 1 crusher, 2 sets rolls, 4 double and 2 single jigs, and give employment to about 40 hands. Wages are from \$1.50 to \$3.00 per day, according to the skill of the workman. Miners receive \$1.75 for 9 hours' labor; all other employees are expected to work 10 hours each day. There are also several pumps in use to drain the mines.

The company owns a large tract of mining land adjoining the city on the west, which is being developed. They are now erecting a first-class dressing plant upon it.

For table of operators, with character of mines date of inspection (July, 1890), see page 50.

Granby Mining & Smelting Co.:

J. H. Stephens, superintendent; mines adjoining Joplin on the northwest. Company lease land in lots 200 feet square to operators, who put in machinery for pumping, etc., paying the company a royalty on zinc 20 per cent, lead 25 per cent.

For table of operators, with character of mines at date of inspection (July, 1890), see page 51.

Guinn & Loyd:

Mr. E. Loyd, superintendent. Mine located $1\frac{1}{2}$ miles southeast of Joplin. Company lease land in lots 200 feet square to operators, who pay the company royalty on zinc 28 per cent. Lead is sold to land owner on what is known as \$25 basis; that is, when pig lead is worth 7 cents per pound in St. Louis, the company pays the mine operators \$25 per 1,000 pounds for first-class lead ore, and rise and fall in proportion to the rise and fall in said market, less 10 per cent pump rent.

The company's machinery for pumping, crushing and cleaning the ore consists of 4 engines, 10 pumps, 2 crushers, 2 sets rolls and one set of steam jigs, which give employment to 12 men.

For table of operators, with character of mine at date of inspection (July, 1890), see page 47.

Interstate Mining Co.:

Formerly known as the Schiffendecker property; located 1 mile east of Joplin; Mr. W. S. Paul, secretary. There are 140 acres of land in this tract, 59 of which are leased to the Dittmar Mining Co., but both companies lease or sub-lease it to mine operators in lots 200 feet square.

For table of operators, with character of mines at date of inspection (July, 1890), see page 47.

Jasper Mining Co.:

Mr. H. Tatcher, superintendent. Mine located $1\frac{1}{2}$ miles northwest of Joplin. Company lease land to mine operators in lots 200 feet square.

There are 3 boilers and engines, 9 pumps (4 of which are in use), owned by the company; also, 3 boilers and pumps, which are the property of the lease holders. The three following mines are upon the land:

Bowersox mine:

Shaft No. 1 is 40 feet deep; steam power. No. 2 is a horse power, 44 feet deep; employs in both mines 4 top men and 4 miners.

John Noland :

Shaft 40 feet deep ; horse power ; employs 4 men.

John Nugent :

Mine No. 1 is a steam power ; shaft 45 feet deep. No. 2 is also a horse power ; shaft 50 feet deep ; they give employment to 8 men.

Kansas City Lead & Zinc Co. :

Mine located 6 miles east of Joplin. This property was formerly known as the old Burch mines. There has been but little work done upon the land during the past year. The mine is operated by steam ; shaft 140 feet deep ; employs 5 top men and 6 miners ; 1 crusher, 1 set rolls, 1 set 'jigs, 2 engines and 1 pump were in use at date of inspection.

Joplin Consolidated Mining Co. :

Mr. A. F. Donnon, superintendent. Property lies in the old Kansas City bottoms, just north of Joplin. The land is leased to mine operators in lots 200 feet square. There are 9 lift-pumps, 6 of which are in operation, and 3 engines upon the land, which is owned by the company. For table of operators, with character of mines at date of inspection, see page 47.

Mahaska Lead and Zinc Co. :

Operated by Rice & James. Mines are located $1\frac{1}{2}$ miles south of Joplin. Some of the land is operated by the company, while some of it is leased to mine operators in lots 200 feet square. The lease-holders pay a royalty of 25 per cent on zinc and 30 per cent on lead. The output from this land shows a fair increase over last year's work. There are 3 engines and boilers, 7 pumps, 2 crushers and 1 set rolls upon the land. For table of operators, with character of mines at date of inspection (July, 1890), see page 47.

Murphy, Byers & Conners :

Mines located $2\frac{1}{2}$ miles northwest of Joplin. Land is leased to the following two companies, who are operating there :

Homes & Sapp are operating three mines, all of which are horse powers ; No. 1 is 104, No. 2, 104, and No. 3, 110 feet deep ; 1 engine and boiler and 3 pumps are in use ; employing 4 miners and 6 other employes at this date (July, 1890.)

The other mine is operated by Warren Bros. Shaft No. 1 is 110 feet deep, steam power ; No. 2, 95 feet deep, horse power ; 2 engines and boilers and 1 pump are in use ; employing 4 miners and 6 top men.

Oswego Mining Co. :

Samuel C. Cooke, superintendent. Mines adjoin Joplin on the east. I was unable to get a complete report from Mr. Cooke as to the number of mines that were in operation upon the company's land. The only one he could give me was operated by Cooke & Co ; shaft 125 feet deep, steam power ; employing 3 miners and 4 top men. For table showing the names of sub-operators upon the Bay State Mining company's lease, which is a part of the Oswego Mining company's land, see page 48.

Pinkard Mine :

Owned by Mr. W. M. Leckie, but is now leased to the two following companies : South 40 acres to Irke Mining company, and the north 40 to Chillowie Mining company. These mines have done but little during the past year.

Snyder Bros.:

John C. Snider, superintendent. Mines located 2 miles south of Joplin.

Company is operating 20 acres of land, leased from Mrs. Allen.

Mines were opened about the 1st of February, and at this date there are eight mines upon the land producing ore. They are putting in a good plant for crushing and washing the ore. For table of operators, with character of mines at date of inspection (July, 1890), see page 49.

South Joplin Lead & Zinc Co :

George H. Pain, superintendent. Mine located $\frac{3}{4}$ of a mile south of Joplin; is a steam plant; shaft 130 feet deep; dressing works consist of 2 engines, 1 crusher, 1 set of rolls and 1 set of steam jigs. The mine gives employment to 6 miners and 11 outside hands; wages are from \$1.75 to \$2.50 per day.

State Line Mining Co.:

Barney Ferguson, secretary. Mines located 6 miles west of Joplin; at this date (July, 1890) there are 4 mines in operation, giving employment to 10 miners and 10 top hands.

Sterling Lead & Zinc Co.:

Mrs. M. C. Proudfoot, agent. Mines located $2\frac{1}{2}$ miles northwest of Joplin. Company lease land to mine operators, who pay company 15 per cent royalty on all ores taken out.

The following three mines are upon the land :

Manhattan mine, shaft 82 feet deep; horse power; one pump; 6 miners and 6 top men are employed.

Little Nugget; steam power; shaft 72 feet deep; one crusher; 4 miners and 6 top men are employed.

Pilgrim mine; horse power; shaft 100 feet deep; employs, miners 4 and top men 4.

Swartz', P. L.:

Mine located $1\frac{1}{2}$ miles north of Joplin, is a shaft 53 feet deep; steam power; use two lift pumps, one crusher, one set rolls, and give employment to 4 miners and 6 top men.

Taylor & Billingsly :

Have a lease on the Montgomery Lead & Zinc Co. land; located $2\frac{1}{2}$ miles northwest of Joplin, which they sub-lease to mine operators, who pay 20 per cent royalty on all ores taken out of the mines; where company does the draining, additional royalty of 5 per cent is charged.

There are 11 pumps upon the land, three of which are owned by sub-operators.

For table showing sub-operators and character of mines at date of inspection (July, 1890), see page 49.

Thacker Mining and Smelting Co.:

I. W. Dreisback, superintendent. Mines located $1\frac{1}{2}$ miles northwest of Joplin. Company has 9 pumps located at different places upon the land, with which to drain the mines, but at this date only 6 are in operation. Land is leased to mine operators, who pay a royalty of 25 per cent to the company, but the land company drains the mines.

For table showing operators and character of mines at date of inspection (July, 1890), see page 49.

Tuckahoe mines :

Operated by E. Loyd. Mines located 3 miles northeast of Joplin. Land is leased in lots 200 feet square to mine operators, who pay land company 28 per cent royalty on zinc and 30 per cent on lead ore, which includes pump rent. There are three boilers and engines and five pumps in operation upon the land at this date.

For table showing operators and character of mines at date of inspection (July, 1890), see page 50.

Viroqua Land Co. :

A. C. Austin, superintendent. Mines located 4 miles east of Joplin. The following companies are operating mines upon the land :

Ozark Drainage & M. Co. :

Dressing works consist of one crusher, one set jigs and one set rolls ; two pumps in use.

Minnegua Zinc M. Co. :

Steam power ; shaft 120 feet deep ; employing 3 miners and 3 top men.

Freeman & Co. :

Horse power ; shaft 85 feet deep, employing 3 hands.

Whitsett Mining Co. :

Mine located $1\frac{1}{2}$ miles north of Joplin. Not in operation at date of inspection, July, 1890.

LEHIGH.**Leckie, W. M. :**

On the Smith land. A. J. Robertson, superintendent. Land is sub-leased in lots 200 feet square to operators, who pay a royalty of 30 per cent to company, which includes pump rent. At date of inspection there were two engines and four pumps in operation.

For table showing operators and character of mines at date of inspection (July, 1890), see page 50.

I understand the mines have been closed down since this inspection was made.

Lehigh Drainage & Mining Co. :

Mines are operated by F. L. Johnston ; J. B. Johnston, general manager. The company also have leases on the Neighbors and Knights land, which are being operated ; mines are sub-leased in lots 200 feet square to mine operators, who pay the company royalty on all ores mined. There are ten pumps, five boilers and stationary engines, which give employment to 6 men.

For table showing operators and character of mines at date of inspection (July, 1890), see page 50.

Gulch Mining & Smelting Co. :

Mr. J. E. Flynn, president. Mine located near Lehigh, but is not in operation at this date, on account of mine falling under the engines, allowing the machinery to settle. I understand that the company is now moving the machinery and rebuilding it, preparatory to commencing operations again.

ORONOGO.**Granby Mining & Smelting Co. :**

Mr. M. T. Downing, Supt. Company lease land in lots 200 feet square to mine operators, who pay them royalty on all ores mined. The mines are drained by the company, for which additional royalty is charged.

For table showing operators and character of mines at date of inspection (July, 1890), see page 51.

Oronogo Union Mining Co. :

M. C. Ihlsing, Supt. This company has a lease on eight acres of land, leased from the Granby M. & S. Co. Shaft 110 feet deep; steam power; one crusher, two sets rolls, two sets jigs and one pump; mine gives employment to 11 top men and 8 miners. This company also has a lease on 55 acres of the Elliott land, which they sub-lease to operators in lots 200 feet square, but these mines were not in operation at date of inspection (July, 1890.)

Circle Mining & Milling Co.:

M. H. Reaser, manager. This mine is also on the Granby M. & S. Co. land; shaft 170 feet deep; steam power; two pumps; gives employment to 8 miners and 4 top men.

WEBB CITY.

Bradley & Co.:

Mine located in the southern part of Webb City. Two shafts, one 80 and the other 150 feet deep; both are horse power; from 3 to 7 men are employed.

Center Creek Mining Co.:

Mr. J. C. Stewart, general manager. Mines are located between Webb City and Carterville. The land is leased in lots 200 feet square to operators, who put in machinery and operate the mines, paying the company royalty.

The mines are drained by ten 12-inch Cornish pumps, located at different places upon the land, and run by two large engines by means of strings. The company's dressing works consist of 1 crusher, 1 set rolls and jigs; about 20 hands are employed in dressing-works, and to look after pumps, strings, etc.

For table showing operators and character of mines at date of inspection (July, 1890), see page 51.

Eleventh Hour Mining Co.:

Owned and operated by Aylor Bros. H. H. Aylor, superintendent. Mine located about 2 miles southeast of Webb City. Land is leased in lots 200 feet square to operators, who pay the company royalty on all ores mined. Two 11-inch pumps are in use with which to drain the mines.

For table showing operators and character of mines at date of inspection (July, 1890), see page 53.

Garrison Lead & Zinc Co.:

Mine located $\frac{1}{2}$ of a mile south of Webb City. W. M. Stealey, superintendent.

In September the mines caved under the machinery, which caused the company much trouble and expense, as the machinery all had to be moved and rebuilt; this was caused by not leaving sufficient pillars in mine to support the roof. This company does no mining, but lease the mines to operators, who sink shafts and operate them, paying the company royalty. The company drains the mines, for which additional royalty is charged. At this date there are three pumps in operation upon the land.

For table showing operators and character of mines at date of inspection (July, 1890), see page 53.

Gaston Mine:

Adjoining Webb City on the south; horse power; shaft 90 feet deep; employs 3 miners and 2 men on top; mine has been in operation only a few weeks.

Houghton & Son :

Mine adjoins Webb City on the south ; mine was opened and worked last fall, but as the timbering around the bottom of the shaft seemed to be giving way they abandoned it, and are now sinking a new shaft which is down 112 feet ; horse power ; employs 2 men.

Jasper Lead and Zinc Co. :

W. C. Rackerby, superintendent ; mine adjoins Webb City on the south ; shaft 184 feet deep ; steam power ; employs 6 miners and 6 top hands. Company also have two 8-inch pumps in operation.

Keller M. Co. :

New company, commenced operations in June, 1890.

Lewis, J. F. :

Mine adjoins Webb City on the south. Shaft 100 feet deep, but ore is now worked at 34 feet ; horse power ; employs 2 miners and 2 top men.

McCorkle Hill :

There are two mines in operation at this date, July, 1890.

George Anderson :

Shaft 55 feet deep ; horse power ; employs 3 miners and 2 top men.

A. A. Chatman :

Shaft 60 feet deep ; horse power ; employs 3 miners and 5 top hands.

Nevada Mining Co. :

Mine located in the eastern part of Webb City ; John G. Gray, superintendent ; company sub-lease land in lots 200 feet square to mine operators, who pay company 22½ per cent royalty on zinc ore. Lead is bought by the company on what is known as \$25 00 basis, as previously explained. There are two pumps, one engine and two boilers operated by the company. For table showing operators and character of mines at date of inspection (July, 1890), see page 53.

Quick Work Mines :

Operated by the Center Creek Mining Co. ; J. C. Stewart, general manager ; mine adjoins Webb City on the south ; company is operating several mines, and have also leased several lots to other operators.

The land is drained by two 8-inch pumps, which are owned and operated by the company. For table showing operators and character of mines at date of inspection, see page 54.

Steelman, A. T. :

Owens and operates 2 mines adjoining Webb City on the south ; No. 1, horse power ; shaft 90 feet deep ; No. 2, horse power, shaft 155 feet deep. The two mines give employment to 5 miners and 12 top men.

Tracy Lead & Zinc Co. :

Mr. M. Clark, superintendent ; mines adjoining Webb City and Carterville on the south. General office is in Joplin.

Dr. S. C. Price, secretary. Company does no mining, but lease land in lots 200 feet square to mine operators, who pay them royalty on all ores mined. There has been much improvement made at several of these mines during the past year, in the way of putting in new machinery, etc.

Company has 2 large pumps in operation upon the land with which to drain the mines.

For table showing operators and character of mines at date of inspection, see page 54.

Victor Mining Co.:

Mine located $1\frac{1}{2}$ miles southeast of Webb City; W. G. Rhoads, superintendent. Company is operating 2 mines at this date. No. 1 is a shaft 165 feet deep; No. 2, 162 feet deep, both of which use steam power. Machinery consists of 1 boiler, 2 engines, 2 10-inch pumps, 1 crusher, 1 set jigs and 1 set of rolls. Mine gives employment to 14 miners and 20 top hands.

ZINCITE.

Block City Mines:

Now operated by Pennsylvania Mining Co.; John Vanbeber, superintendent. Mines have done but little during the past year, but the company is now putting in engines, crushers, steam jigs, etc.

Black & Co.:

On the Picher land; horse power; shaft 50 feet deep; employs 2 miners and 3 top men; the principal product is lead.

Buckeye Mining Co.:

W. A. Campbell, agent. The mines upon this land have turned out but little ore during the past year, but at this date (July, 1890), there are 2 pumps in operation draining the mines preparatory to commencing operations; there are 5 hands employed.

Chatman & Co.:

Operating a mine upon the Grimes land, located 3 miles northeast of Zincite. Cyrus Chatman, superintendent.

Steam power; shaft 130 feet deep; 1 lift pump; employs 2 miners and 2 top men.

Concentration Lead & Zinc Mining Co.:

Mine located 1 mile north of Zincite, on W. E. Johnson's land.

This is an old prospect, ore having been mined 12 years ago upon the land, but the falling off in price of lead ore caused the mines to be abandoned until last fall, when they were reopened by this company, and at this date (July 8, '90) there are 6 men employed and 2 pumps in operation.

Cottonwood Mining Co.:

Operated by Ch. Guengerich; mine located $1\frac{1}{2}$ miles southeast of Zincite.

There is but 1 mine at this date (July, 1890) producing ore upon the land.

Shaft 90 feet deep; steam power; 1 pump in use; employ 4 miners and 6 top men; there are also 12 men prospecting upon the land.

Gretchen Lead & Zinc Co.:

Known as the east "Hollow mines." Henry Hollingsworth, superintendent.

This company bought the property from the Stephens M. Co. in June, since which time it has been operated by them. One mine is being operated by the company, and several by leaseholders, who pay a royalty of 25 per cent on zinc ore when company does the draining, and 10 per cent when leaseholder does the draining.

For table showing operators and character of mines at date of inspection (July, 1890), see page 55.

Holden, S. B.:

Mines located at Zincite. This tract comprises 40 acres of land; leased in lots 200 feet square to operators, who pay a royalty of 20 per cent where the leaseholder drains the mine, and 25 per cent where land owner does the draining.

For table showing operators and character of mines at date of inspection (July, 1890), see page 55.

Murphy, Pat:

Mines located at Zincite. Land is leased in lots 200 feet square to operators, who put in machinery and work the mines, paying a royalty of 20 per cent on lead, and from 10 to 20 per cent on zinc; mine operator drains the land.

For table showing operators and character of mines at date of inspection (July, 1890), see page 55.

Rosamond M. Co.:

Mines located $\frac{1}{2}$ mile south of Zincite. H. H. Williams, superintendent. Company sub-leases land in lots 200 feet square to operators, who pay a royalty of 20 per cent.

The following three mines are upon the land operated by sub-operators:

Darlington Mine:

Shaft 100 feet deep; steam power; 1 pump, 1 crusher and 1 set rolls are in use, giving employment to 4 miners and 4 top hands.

Thornton & Co.:

Shaft 60 feet deep; horse power; employs 4 miners and 4 top men.

Wimen & Kemp:

Shaft 55 feet deep; steam power; 1 pump; only 2 men are employed.

Sherwood mines:

Located 3 miles northeast of Zincite; James Houseman, superintendent. Mines were idle at date of inspection (July 16, 1890), having closed down several days before. Miners were complaining because the company had neglected to pay them for work performed. There are 2 boilers, 1 engine and 2 Cook pumps, which were in use.

Standard Lead & Zinc Co.:

Mines located near Zincite; Mr. J. H. Dangerfield, superintendent. Company has a lease on 70 acres of land.

The two following mines are operated by the company, both using steam power; each about 150 feet deep. The machinery at dressing works consists of 2 engines, 2 boilers, 1 crusher, 1 set rolls and 2 sets jigs; 3 large pumps are also in operation; employ 8 miners and 10 top hands.

The following three mines are also upon the land but are leased to sub-operators, who pay a royalty of 20 per cent to the company:

Hoover & Co.:

Shaft 160 feet deep; steam power; 1 crusher and 1 set jigs (ruffers) are in use; employ 6 miners and 8 top hands.

Lichliter & Wilson :

This is a new mine, having been in operation only a few weeks (date of inspection July, 1890). Shaft 75 feet deep ; steam power ; 1 set rolls, 1 crusher and 1 set jigs ; employs 6 miners and 6 top hands.

Zincite Blend Mining Co. :

Steam plant ; operating two shafts, each 160 feet deep ; one crusher, one set rolls, one set steam jigs and one pump are in use ; employ 6 miners and 5 top men.

West Hollow Lead and Zinc Co. :

Mr. Grane Sanson, Supt. Mine located near Zincite. In April this property was sold to St. Louis parties, who are now putting in new machinery, which, when complete, will consist of one crusher, 1 set rolls, one set jigs, one pump and engine. Blanchard & Copley have a lease of 10 acres of the land, a part of which they operate themselves, while part is sub-leased to operators. Their machinery consists of two engines and boilers, 3 pumps, one crusher, one set rolls and one set jigs.

For table showing operators and character of mines at date of inspection (July, 1890), see page 55.

JEFFERSON.**Valle Mining Co. :**

These mines are located $11\frac{1}{2}$ miles southeast of DeSoto, and from $1\frac{1}{2}$ to $2\frac{1}{2}$ miles south of Valle Mines postoffice. L. J. Rozler, Supt. Company owns about 6,000 acres mineral land in this and St. Francois counties, upon which these mines are located ; some of the shafts are operated by the company, while a number are leased to miners, who pay a royalty on all ores mined to the owners. Both galena and silicate of zinc are mined ; the galena is smelted at the mines ; the silicate of zinc is shipped to St. Louis to be smelted ; the ore is found from the grass roots to a depth of 190 feet, this being about as deep as the ground has been prospected. February 15 I visited and made a careful inspection of mines Nos. 1, 2, 3, 4 and 6, all of which are connected by entries, or tunnels ; they are operated by horse power, depth ranging from 80 to 165 feet ; all of these mines were well ventilated and drained. There are also a number of other shafts upon the land operated by miners, or individual operators.

JOHNSON.**T. H. Boyd & Sons :**

Mine located $1\frac{1}{2}$ miles south of Knob Noster ; steam plant ; shaft 76 feet deep ; coal $3\frac{1}{2}$ feet thick, worked pillar and room plan ; pay 62 $\frac{1}{2}$ cents per ton for mining ; from 9 to 20 men are employed.

D. A. Bullock :

Drift, located $4\frac{1}{2}$ miles south of Montserrat ; coal about 20 inches thick, worked pillar and room plan ; pay 80 cents per ton for mining ; mine worked in fall and winter for home consumption.

John B. Evans :

Mine located near Warrensburg ; shaft 20 feet deep ; coal 20 inches thick, worked pillar and room plan ; is only operated in fall and winter for local trade.

P. D. Fitch :

Mine located $4\frac{1}{2}$ miles south of Montserrat ; is a drift ; coal 28 to 30 inches thick, worked pillar and room plan ; from 3 to 7 men are employed ; pay 75 cents per ton in summer, and 87 $\frac{1}{2}$ in winter.

John A. Henry :

Mine located near Warrensburg; drift, ventilated by a furnace; coal 22 inches thick and worked pillar and room plan; employs from 4 to 8 men.

John House :

Is operating a mine 4 miles north of Montserrat; coal $3\frac{1}{2}$ feet thick, worked pillar and room plan; pay \$1 per ton for mining.

M. B. Meily :

Drift, located $1\frac{1}{2}$ miles northwest of Warrensburg; coal 18 inches thick, worked on the pillar and room plan; mine gives employment to 9 men; coal used for local consumption.

Joseph Murley :

Drift, mine ventilated by a furnace; coal 2 feet thick, worked pillar and room plan; pay 75 cents per ton for mining; employs from 2 to 7 men.

B. F. Wood :

Slope, located near Warrensburg; coal 20 inches thick, worked pillar and room plan; employs 5 to 6 men; mine operated for home consumption.

There are a number of other mines that are worked by farmers and local operators in fall and winter for local trade.

LAFAYETTE.

There were 39 mines in this county reported as producing 329,845 tons of coal, which was sold for \$508,743, or \$1.54 per ton. In the report of 1889 there were 33 mines reporting 320,448 tons, which was sold at \$1.67 per ton, or \$536,997. This shows an increase of 9,397 tons over the report of 1889, but a decrease of \$28,254 in the value of the product.

CORDER.**Corder Coal and Coke Co. :**

H. G. Smith, superintendent; mine connected with the C. & A. R. R. by a switch; shaft 100 feet deep; steam power; ventilated by an 8-foot fan, which was removing 8,960 cubic feet of air per minute, which was being forced and circulated to all parts of the mine in good condition. Coal is from 18 to 20 inches thick, worked on the long-wall plan; employs from 60 to 120 miners, and from 4 to 6 day hands.

McCarty, C. T. :

Shaft 22 feet deep; horse power; coal 20 inches thick, worked long-wall plan; employs from 2 to 4 men.

HIGGINSVILLE.**Bonanza Coal Co. :**

Mine located $1\frac{1}{2}$ miles east of Higginsville; shaft 70 feet deep; horse power; mine was idle at date of inspection (April 25), and had been for several days, and was not to be worked before August; therefore I did not go down the shaft, but gave the superintendent, Mr. Brandon, notice to sink an escapement shaft before he put the mine in operation again, if he calculated to employ more than ten men. I have since received notice that the escapement has been completed. Coal is about 18 inches thick, worked on the long-wall plan.

Bruce & Knoble Coal Co. :

Mines connected with the C. & A. R. R. by a switch; shaft 45 feet deep; horse power; ventilated by a small furnace; mine in good condition.

Excelsior Coal and Coke Co.:

Mine located $\frac{3}{4}$ of a mile west of Higginsville, connected with the C. & A. R. R. by a switch; J. H. Campbell, superintendent; shaft 68 feet deep; steam power; mine was inspected April 12; at that time it was ventilated by a furnace which was removing 2,800 cubic feet of air per minute; this being inadequate, I so informed the superintendent, who said they were soon to erect a fan to take the place of the furnace.

A few weeks later the tip-house was burned down, which was a loss to the company of about \$1,000. In a letter from Mr. Campbell, superintendent, dated August 5th, he says: "We have rebuilt our tip-house and erected a ten (10) fan; our trouble now is, we have too much air." While this statement seems to be rather extreme, I am satisfied that this fan is sufficient to ventilate the mine excellently.

Coal is from 16 to 18 inches thick, and worked on the long-wall plan; from 40 to 80 men and boys are employed in and about the mine.

Farmer Coal Co.:

This company owns and operates three mines, located from $1\frac{1}{2}$ to 2 miles southwest of Higginsville, all of which are connected with the C. & A. R. R. by switches. Mr. J. H. Leonard, general manager. Coal is from 16 to 18 inches thick; worked on the long-wall plan.

Mine No. 1 is a shaft 40 feet deep; horse power; one part of this shaft was bratticed off and used as an air shaft, the small furnace being located at the bottom and a few feet back from the shaft. The chimney, which extended up above the shaft-top, was blown down in March; no effort had been made to rebuild it, neither was there any fire in the furnace; they were depending on nature for ventilation. I immediately notified Mr. Leonard of this fact, and requested him to comply with the law, by ventilating the mine properly. I do not yet know whether he has complied with this request; however, there have been no complaints from the miners.

Mine No. 2—Shaft 22 feet deep; horse power; mine in fair condition.

Mine No. 3—Steam power; shaft 58 feet deep; machinery and cages were in poor condition; safety catches blocked up; they did not seem to know that there was a mining law; they were duly notified that the law must be complied with, but I do not yet know whether they have complied with my request. These three mines give employment to from 30 to 100 men.

Freshly & Wyman:

Operating a shaft located $3\frac{1}{2}$ miles southeast of Higginsville, for local trade.

Gunn, J. C. & Co.:

Mine located 2 miles southwest of Higginsville; connected with the C. & A. R. R. by a switch. Drift; ventilated by a small furnace; coal from 16 to 18 inches thick; worked on long-wall plan.

Haygood Coal Co.:

Mine located 2 miles southwest of Higginsville; connected with the C. & A. R. R. by a switch. Shaft 18 feet deep; horse power; ventilated by a furnace.

In February, 1889, an escapement shaft was sunk, but it was shut off from the workings by a fall on traveling road in April. Company sunk a new one immediately in a more convenient place; mine is now in good condition.

Hawkins & Smith Coal Co.:

Mines located 1 mile west of Higginsville; shaft 80 feet deep; horse power; ventilated by a small furnace which was giving good results; coal is about 17 inches thick; worked on the long-wall plan.

Jackson & Taggart Coal Co.:

Mine located $2\frac{1}{2}$ miles southwest of Higginville; J. I. Parrish, mine boss; shaft 58 feet deep; horse power; ventilated by a small furnace, which was giving very good results. Coal is from 14 to 16 inches thick; worked on the long-wall plan.

Mason Coal Co.:

Mine idle at date of inspection (April 24), and had been for several months.

Rocky Branch Coal Co.:

M. L. Belt, general manager. This company owns and has control of a large tract of coal land lying in the vicinity of Higginville. The mines they have now open were not in operation at date of inspection (April 25), having shut down until fall, owing to the dull trade in summer.

Stealy & Fowler Coal Co.:

T. J. Fowler, general manager; mines located $1\frac{1}{2}$ to 2 miles southwest of Higginville, and are connected with the C. & A. R. R. by switches.

All of these mines are worked on the long-wall plan; coal is from 14 to 19 inches thick.

Mine No. 1—Shaft 14 feet deep; horse power; ventilated by a furnace, which was giving good results date of inspection (April 21), but no gates or protection around the top of shaft. On calling Mr. Fowler's attention to this fact, he said he would have the matter attended to at once, which he did.

Mine No. 2—Shaft 20 feet deep; horse power; not in operation at date of inspection, having closed down temporarily in February.

Mine No. 3—This is a new mine, worked by a drift; it is connected with No. 2 on the south. The mine is now ventilated by nature, but I understand the company is to erect a furnace in No. 2 to ventilate both mines; air was good date of inspection.

Mine No. 4:

Is a slope operated by Buck Bros. Ventilated by a small furnace; mine new, having been in operation only five or six months.

Winsor Coal Co.:

Mine located 2 miles west of Higginville; connected with the C. & A. R. R. by a switch; W. H. Winsor, general manager. Shaft 40 feet deep; steam power; ventilated by a furnace which was giving good results; roof and roadways in very good condition; mine well drained; coal is from 16 to 19 inches thick and worked on the long-wall plan.

LEXINGTON.**Bell, W. T.:**

Mine operated by W. H. Greer. Mine located $\frac{1}{2}$ of a mile south of Lexington. Worked by a drift; coal from 15 to 20 inches thick; worked on long-wall plan.

Greer, W. H.:

Mine located $\frac{1}{2}$ of a mile south of Lexington. Is a drift; ventilated by a small furnace; from 4 to 8 men are employed; coal worked on long-wall plan.

Kelly & Lordick:

Have opened a slope on Mr. Holwell's land which they are now operating; mine was well drained and in fair condition at date of inspection, April 12.

Kist, Joseph :

Mine located $\frac{3}{4}$ of a mile south of Lexington; is a drift; employs from 4 to 8 hands; coal is about 18 inches thick; worked on the long-wall plan.

Lafayette Coal Mining Co :

Mine located $4\frac{1}{2}$ miles east of Lexington. Wm. Kerdolff, superintendent. Drift; ventilated by a furnace which was giving fair results; mine fairly well drained at working face, but roadways were wet and muddy; roof good in most parts of the mine; however it was bad on first left and first right-hand entries; this was probably caused by these two entries being so near the crop; coal is about 18 inches thick, and is worked on the long-wall plan.

Lexington Coal Mining Co.:

M. W. Serat, superintendent. This company is operating 5 miles in the vicinity of Lexington, all of which are drifts, connected with the Mo. P. R. R. by switches.

Coal is from 17 to 22 inches thick, and worked on the long-wall plan. Company pays for mining when miners deliver the coal at weigh office 4 cents in summer and $4\frac{1}{2}$ cents in winter per bushel, but where the company employs mules to bring the coal to the weigh office, $3\frac{1}{2}$ cents is paid in summer and 4 cents in winter.

The mines are as follows :

Riverton Mine No. 1 :

Drift; located $1\frac{1}{2}$ miles east of Lexington; ventilated by a furnace which was removing 6,400 cubic feet of air per minute. The air is taken in at main entry, and an old entry to the west of main entry, and conducted to the head of first right-hand entry and around the face of coal, and down the first left-hand entry to the furnace in one continuous current, which is over 4,000 feet the air had to travel from the time it enters the mine until it goes out at the up-cast; therefore it contained a large per cent of carbonic acid gas before reaching the men who work on the last of the air; I made some suggestions to Mr. Nord, the mine boss, in regard to increasing the air current, which he assured me would be complied with, and I have since received notice from the superintendent that the air in this mine has been improved since my inspection, and that the mine is now well ventilated and in good condition.

Riverton Mine No. 2:

Located 2 miles east of Lexington; ventilated by a furnace which was giving good results; roadways in good condition; mine well drained; roof on west side good, but poor on east; this is probably caused by the coal in this part of the mine being near the surface—149–157. It was in this part of the mine where Frank Leroux was hurt last November by fall of slate, receiving injuries from which he died two months later.

No. 3 mine:

Abandoned on account of the roof being bad.

Seawell mine :

Located $1\frac{1}{2}$ miles west of Lexington; is a drift; ventilated by a 10-foot fan, which was also ventilating the Hackett mine. Air measurement was 13,500 cubic feet per minute. Mine well drained; roof good. I visited all parts of the mine, and found it well ventilated and in good condition.

Hackett Mine :

Is also ventilated by the same furnace which ventilates the Seawell mine. I made a careful examination of all parts of this mine April 16, and found it in a safe and healthy condition.

Graddy Mine:

Located about $\frac{1}{2}$ mile west of the Hackett mine. Ventilated by a furnace which was removing 8,400 cubic feet of air per minute; this air was being forced and circulated to the face of the workings in good condition. Mine was well drained; roof and roadways were also good.

The company has also opened a new mine near Lexington during the last year, which is a shaft 45 feet deep, equipped with good machinery, etc., of ample capacity for the work it has to perform; the mine is now ventilated by a furnace, but it is the intention of the company to erect a 12-foot fan in a few weeks.

Lexington & Dover Coal Co.:

Mine located $1\frac{1}{4}$ miles east of Dover station, connected with the Missouri Pacific railroad by a switch. Lee Davis, superintendent.

April 18th I visited and made a careful examination of this mine, and found it in bad condition. The little ventilating furnace was located near the mouth of the east opening, its capacity not being sufficient to run the anemometer; the chimney was only about 4 feet in area and extended about 12 feet above the surface; a door which was hung at the mouth of the entry to prevent the air from passing into the furnace without circulating around the working face was old and leaking, and as the miners, in going to and from their work, had to pass through it, it was often left open, being hung in such a manner that it would not close itself.

The right-hand entry was poorly drained; roof poor on left-hand or east opening, but fair in all other parts of the mine.

Coal about 18 inches thick, worked on the long-wall plan.

After making this inspection, I gave the company notice to increase the air current within ten days to at least one hundred cubic feet per man per minute, as required by law. On the 29th I again visited the mine and made an inspection, and found the mine in about the same condition, and most of the miners out on account of bad air. I returned to Lexington immediately, fully determined to enter criminal prosecution against the company.

The prosecuting attorney, with whom I consulted, advised me to consult Messrs. Davis & Steel, the mine owners, as it was very likely that they knew nothing about the condition of the mine. I called upon these gentlemen the next day and explained the whole matter to them, and they agreed to go with me to the mine and see what could be done to better its condition, which they did.

After consulting with their superintendent and miners, they gave orders to sink an air shaft and put the mine in proper condition as soon as possible, and as they put men to work at once to sinking an air shaft in suitable location, which was approved by all of the miners as well as myself, I left them, assured that the work would soon be completed and the mine in good condition. Following is a letter from the superintendent, which explains itself:

LEXINGTON, Mo., June 27, 1890.

C. C. WOODSON, State Mine Inspector, Jefferson City, Mo :

DEAR SIR—On my return from the mines to-day your favor of the 21st inst., addressed to me here, came to hand. In reply will say that air shaft has been completed in accordance with your suggestion. It is about 50 feet in depth, 6x8 square from top to bottom, with 45 feet of entry to bottom of shaft. Main track lifted to rock and 7 feet wide, with good furnace and grate bars, and all

in good condition and well built. If it shall be found, in time, draft is not entirely adequate, the chimney can be built to any height required. Also, the main entry has been widened and lifted to rock, and 4x4 timbers laid down, and cross ties 2x4 on top of the 4x4s, and all completely covered over with good plank and thus made dry; and we think it the best made entry of any mine in the country. Also, other entries have been deepened, dried and much improved, and when you come again we believe you will be pleased with things. We propose making the mine first-class in all respects, and are obliged to you for suggestions, etc.

Very truly,

LEE DAVIS, Supt.

Macey's mine :

Drift, located 2 miles west of Lexington, on Mo. Pacific R. R. Joseph Perry, mining boss. Mine is ventilated by a furnace, which was giving good results; coal is about 18 inches thick, worked on the long-wall plan. The mine was found to be well ventilated and in good condition.

McGrew, J. C. :

Owens and operates 2 mines, both of which are drifts, located about 3 miles west of Lexington, and connected with the Mo. P. R. R. by switches.

Mine No. 1—Ventilated by a furnace; roof and roadways in good condition; mine well drained; long-wall plan.

Mine No. 2—Ventilated by a small furnace; mine was idle at date of inspection (April 17), therefore no fire in furnace and but little air passing around the face of coal; roof and roadways in good condition; mine well drained; worked on the long-wall plan; coal is from 17 to 22 inches thick.

Morrison Bros. :

Mine located 2 miles west of Lexington; is a drift; coal about 18 inches thick; worked on the long-wall plan; 4 to 8 men are employed.

O'Maley, Andrew :

Mine located 1 mile south of Lexington; is a shaft 25 feet deep; horse power; employs from 5 to 7 men.

Walton, T. :

Drift, located $\frac{1}{2}$ mile east of Lexington; employs from 8 to 10 men; coal used for home consumption.

MAYVIEW.

Strasburg & Son :

Mine located $\frac{1}{2}$ mile east of Mayview; connected with the C. & A. R. R. by a switch.

Shaft 97 feet deep; horse power; ventilated by a furnace, which was giving good results. This mine was inspected April 23, and found to be in fair condition. Coal about 17 inches thick; worked on the long-wall plan; from 12 to 20 miners are employed.

NAPOLEON.

Missouri River Coal Mining Co. :

Located near Napoleon; connected with the Mo. P. R. R. by a switch. J. B. Silvers, superintendent.

Shaft 65 feet deep; horse power; ventilated by a furnace. Mine was idle at date of inspection (April 10), and had been for several days, and as they did not know whether the mine would be put into operation any more before fall, I did not make an inspection of the inside, but gave the superintendent notice to sink an escapement shaft, which he did. Coal is from 17 to 20 inches thick; worked on the long-wall plan.

NAPOLEON.**Napoleon Coal & M. Co.:**

Mine located at Napoleon; Mr. J. H. Duffendack, superintendent; is a shaft 46 feet deep; horse power. In September, 1889, the company completed an escapement shaft, which is in good condition; coal is from 17 to 20 inches thick, worked on the long-wall plan; from 9 to 15 hands are employed.

WATERLOO.**Hartman & Gilbert:**

Mine located near Waterloo, connected with the Mo. P. R. R.; shaft 28 feet deep; horse power. Mine was inspected April 10; found to be in good condition and well ventilated by a furnace; coal is worked on the long-wall plan.

WELLINGTON.**Andrew Carter:**

Is operating a mine located 1 mile east of Wellington for home consumption, coal is about 18 inches thick, worked on the long-wall plan.

Seawell, J. M. & Co.:

Mine located a mile and a half west of Wellington, connected with the Mo. P. R. R. by a switch; shaft 44 feet deep; ventilated by a furnace, which is located near the bottom of hoisting shaft. One part of the hoisting shaft is bratticed off and used as an up-cast or ventilating shaft; but as the brattice work was leaking a large part of the air, it was found to be inadequate at the working face. Mr. S. C. Archer's (mine boss) attention was called to this deficiency and requested to have it repaired at once, and as we have had no complaints from the miners of this mine, I have no doubt that the deficiency has been repaired. Coal is about 18 inches thick, worked on the long-wall plan.

Wellington Coal Co.:

Mine located at Wellington; W. B. Steele, superintendent. In January company sunk an air shaft, which is in good condition. Mine was idle at date of inspection (April 12), having shut down for the summer; therefore I did not make an examination of the inside workings.

LAWRENCE.

The output of ores from this county has shown a wonderful increase during the past year. In 1889 there were eleven mining companies in the county that produced 13,027½ tons of zinc, which sold for \$177,518, or \$13.62 per ton, and 1,231½ tons of lead, which sold for \$54,433, or \$42.48 per ton, making total value of both lead and zinc \$231,951. In 1890 there were fifteen companies in operation, which produced 2,873½ tons of lead which were sold for \$126,793, or \$44.74 per ton, and 12,877 tons of zinc, which were sold for \$197,711, or \$15.35 per ton, making total value of both lead and zinc \$324,504, or an increase over 1889 of \$92,553.

AURORA.**Aurora Zinc Co.:**

Own 9½ acres of land upon which the following four mines are located. Warren Vertrees is superintendent; company lease the land in lots to operators, who pay 15 per cent royalty on all ores mined. There are also several mines upon the land which have been in operation during the year, but at date of inspection (August, 1890) were idle; therefore they are not considered in this report.

Conner & Co.:

Shaft 85 feet deep; steam power; employs 3 miners and 3 top men.

Dalby, J. M.:

Shaft 95 feet deep; horse power; employs 2 miners and 2 top hands.

Robertson & Morton:

Shaft 90 feet deep; steam power; dressing-works consist of 1 engine and boiler, 1 crusher, 1 set rolls and 1 set steam jigs; 1 pump in use. This is considered a good plant, well equipped with good machinery, etc.; it gives employment to 18 miners and 12 top hands.

Taylor & Co.:

Operating a part of the Conner lot; shaft 25 feet deep; hand power; employs 4 men in and about the mine. The products of this mine are silicate and carbonate of lead.

Brinkerhoff Mining Co.:

Mines are located one mile east of Aurora; company lease the land in lots 100 feet square to operators, who pay a royalty on all ores taken out. At this date (August) there are about 15 men prospecting upon the land, besides three regular mines which are in operation as follows:

Beazley, H. H.:

Shaft 70 feet deep, but working at 15 feet, taking out carbonate of lead; horse power; employing 4 men.

Burk & Co.:

Shaft 70 feet deep; steam power; new mine; 1 pump, and 6 men are employed.

Moore & Maynard:

Shaft 65 feet deep; steam power; mine gives employment to 5 miners and 5 top hands.

Dayton mining land:

Mines located $\frac{1}{4}$ of a mile west of Aurora; C. M. Dayton, proprietor; lead and zinc were struck on this land July, 1889, and at this date (August, 1890) there are 4 mines producing ore, besides about 20 men prospecting. The land is leased in lots to operators, who pay the land owner a royalty of 20 per cent on lead and 10 per cent on zinc ore. Following four companies are operating mines upon the land.

Drake & Co.:

Shaft 35 feet deep; hand power; mine gives employment to 7 men.

Foley & Co.:

Shaft 30 feet deep; hand power; 4 men are employed.

Howard & Co.:

Shaft 50 feet deep; horse power; 6 hands are employed.

Hitchen & Co.:

Shaft 37 feet deep; horse power; 4 men are employed.

Decatur Lead & Zinc Co.:

George Van Riper, superintendent. Mines located $\frac{1}{2}$ mile northeast of city limits. The company bought this land in May, 1889; they do not do any mining, but lease the land in lots 200 feet square to operators, who put in machinery and work the ground, paying the company 20 per cent royalty.

For table showing operators and character of mines at date of inspection (August, 1890), see page 56.

Kentucky Mining Co.:

R. S. Nock, superintendent. Mines located 1 mile east of Aurora. Company own about 20 acres of mineral land upon which these mines are located. In addition to the mines which are producing ore, there are about 13 prospect shafts being sunk, which give employment to about 30 hands. The land is leased in lots to operators, who operate the mines, paying the company royalty; the company also drains the mines, for which additional royalty is charged.

For table showing operators and character of mines at date of inspection (August, 1890), see page 56.

Lehnhard, Newman & Folk:

Own 80 acres of land adjoining Aurora on the northeast. Jacob Rhielen, superintendent. Land is leased to mining companies, who pay land owners a royalty of 15 per cent on zinc and 20 per cent on lead—mining companies doing their own draining. In addition to the regular mines which are producing ore, there are 16 prospect shafts being sunk, which give employment to about 45 men.

For table showing operators and character of mines at date of inspection (August 1890), see page 57.

T. J. Liles:

Mines upon this land are in the corporation of Aurora. The land is leased in lots 200 feet square to operators, who put in machinery and operate the mines, paying the land owner royalty of 20 per cent. There are about 14 men prospecting upon the land, in addition to those employed in the regular mines.

For table showing operators and character of mines at date of inspection August, 1890), see page 57.

Louisville Zinc & Lead Mining & Smelting Co.:

W. M. Johnston, Supt. Company operate most of the mines; there are a few, however, that are leased to mining companies. The company's dressing works consist of one crusher, one set rolls and several hand jigs; they are now sinking a large shaft, which is being well timbered, to be used as a draining shaft, and also to prospect the ground; the superintendent informs me that it was the company's intention to sink this shaft to a depth of 300 or 400 feet.

For table showing operators, with character of mines at date of inspection (August, 1890), see page 58.

Lewis Lyon:

This property has been in litigation for some time, which has hindered the progress of work, but at this date the difficulty has been settled, and one of the mines is now operated by J. C. Thurman; shaft 25 feet deep; horse power; employing 3 hands; work only for silicate of zinc.

Midland Mining Co.:

George Van Riper, Supt. These mines have been in operation about one year; they are leased to mine operators, who pay a royalty on all ores mined. In addition to the regular mines, there are about 15 men prospecting upon the land.

For table showing operators and character of mines at date of inspection (August, 1890), see page 58.

Nevada Gem Mining Co. :

C. Garwood, Supt. Company bought this property from Mr. Seburn last December, since which time it has been operated. The principal ore mined is carbonate of lead, which is found near the surface ; the average depth of the shafts is not over 20 feet ; at this date (August, 1890), there are 8 men employed in and about the mines which produce ore, and 4 men employed prospecting ; there are one pump, one engine, boiler and one steam drill in use upon the land.

Ozark Range Mining Co. :

R. S. Nock, superintendent. This company own 52 acres of mineral land lying $\frac{3}{4}$ of a mile east of Aurora, upon which these mines are located. The land is leased in lots 200 feet square to operators. In addition to the regular mines that are producing ore, there are 8 prospect shafts being sunk which give employment to about 20 men. For table showing operators and character of mines at date of inspection (August, 1890), see page 58.

Reed, Charles A. :

Mines located one mile north of Aurora. This land is leased to operators who work the mines, paying the land owner royalty. The four following mines are in operation upon the land at this date (August, 1890):

Mahew & Co. :

Shaft 60 feet deep, steam power ; 1 pump ; 4 men are employed ; mine idle at this date, making repairs.

Reed & Co. :

Shaft 45 feet deep, horse power ; 3 employes.

Sweeney & Co. :

Shaft 55 feet deep, horse power ; 4 employes. They are now putting in a steam hoister.

Vicker & Co. :

Shaft 40 feet deep, horse power ; 3 employes.

Rinker Lead and Zinc Co. :

J. L. Rinker, superintendent. The property adjoins Aurora on the east. The company does no mining, but lease the land in lots to operators, who pay them 20 per cent royalty. In addition to the mines that are producing ore, there are 14 prospect shafts being sunk, which give employment to about 32 men. For table showing operators and character of mines at date of inspection (August, 1890), see page 59.

Vance, J. T. :

Land located $\frac{1}{4}$ of a mile northeast of Aurora. Ore was first struck on this land July, 1889, but not in paying quantities until May, 1890. The only mine that is at this date (August, 1890) producing ore is operated by Reynold & Co. Shaft 82 feet deep, steam power ; 1 steam pump is in use ; mine gives employment to 6 miners and 10 top men. Since this mine has commenced turning out ore it seems to have created an excitement in mining circles, as there are now 20 prospect shafts being sunk upon the land, giving employment to about 40 men.

LINN.

Clark mine :

Located near Brookfield ; shaft 135 feet deep ; horse power ; employing from 4 to 10 hands ; coal about 2 feet thick ; worked pillar and room.

Morris mine :

Located near Brookfield ; shaft 140 feet deep ; horse power ; employing from 4 to 7 hands ; coal about 2 feet thick ; worked pillar and room plan ; it is used for home consumption.

Kansas & Texas Coal Co. :

John R. Braidwood, superintendent ; mine located near Marcelline ; connected with the C. S. Fe & C. R. R. by a switch.

This property was bought by this company last fall and put in operation in October. The coal is brought to the surface through a shaft 178 feet deep ; steam plant ; machinery, etc., in good condition ; mine is ventilated by a 12-foot fan ; coal is about 26 inches thick ; worked on the long-wall plan. The mine discharges a small quantity of fire-damp, but seems to be carefully looked after by the officials. Hugh Reed, mining boss.

MADISON.

Mine, LaMotte :

Owned and operated by Rowland Hazard ; W. B. Cogswell, agent ; Mr. J. D. Sanders, superintendent. This is probably the oldest lead mine in the State ; the ore was discovered near the surface by the Renault expedition in 1720, but it is said by the old inhabitants that the Indians knew of the ore long before white settlers came into the State.

About the year 1723 a man by the name of LaMotte (for whom the mines are called) opened and worked the mines. The present owner bought the property, comprising about 24,000 acres, from the LaMotte Lead Co. in 1875. Since that time it has been operated by him. Ore is disseminated in magnessia limestone ; some nickel and cobalt with traces of copper are found, which are separated from the lead and shipped to the eastern markets. Employees' wages range from \$1.10 to \$1.65 per day, miners receiving \$1.30.

Mines Nos. 1 and 2 are connected. All the ore is hoisted out of No. 1, which is 100 feet deep ; steam power ; mine and machinery in good condition ; about 76 men are employed.

Mine No. 4—Shaft 137 feet deep ; steam power ; mine and machinery in good condition ; 38 hands are employed.

Mine No. 5—Steam power ; shaft 140 feet deep ; about 36 hands are employed. The mine is also well ventilated and in good condition.

All of these mines are equipped with good machinery, cages with safety catches, etc., as required by law.

MACON

Kansas & Texas Coal Co. :

Tom Fleming, general manager. Mines located at Ardmore. Company is operating several mines at this place, all of which are connected with the Wabash railroad by switches. They are all drifts, worked pillar and room plan, and usually double entries are driven. The coal averages 4 feet in thickness. Company pay

for mining 50 cents per ton for unscreened coal, and 70 cents for clean coal. The miners use a great quantity of powder, many of them blowing the coal from the solid without undercutting or mining, and as the coal is of a soft character, it makes a large per cent of slack and fine coal. During the year the company has put in a revolving screen at mine No. 26, therefore they are now making three grades of coal.

May 13 I visited and made a careful examination of mine No. 26, and found that the company had made no effort to better the ventilation, although Mr. Bradford, mining superintendent, assured me on my last inspection in October, 1889, that the company would soon sink an air shaft near the head of main entry, and erect a furnace in same. After visiting all parts of the mine and taking a measurement of the air, which was only 5,620 cubic feet per minute, 1,887 cubic feet less than on last inspection, I deemed it my duty to give the superintendent notice to increase the air current in mine within a reasonable length of time. I again made an inspection of the mine June 2 to satisfy myself as to whether they had made any effort to comply with my request, and found that the air shaft in question had been commenced and was completed in a few days thereafter, as stated to me in a letter by Mr. Fleming, general manager. A fire had broken out in an old room on first left-hand entry several days before my first inspection, which was throwing off large volumes of black-damp and smoke, but fortunately it was on the return of the air and outside of all working rooms. The room had been sealed up several times, but the fire managed to find its way out in some way. This fire probably was the cause of a part of the deficiency in the air current. With this exception, I found the mine in fair condition. About 70 miners were employed.

Mine 26½ :

Operated by George Ferris. This mine was about finished. There were only a few men employed drawing pillars, etc., therefore I did not make an inspection. Mine finished July 1, 1889.

Mine 27 :

Ventilated by a furnace which was giving good results. Mine well drained ; roadways fair ; roof poor in many places, therefore requiring an extra amount of timbers to keep it secure, which are kept on hand by company.

There are about 25 men employed, most of whom are pulling pillars. Wm. Thomas, mining boss. June 3, I visited the mine again in response to a letter from Mr. Thomas Fleming, general manager, stating that a miner by the name of Sherman Watson had been killed by falling roof on the 15th of May. After making a thorough examination of the mine, and examining several witnesses, I found that deceased came to his death on May 15, by being crushed by a fall of rock on main entry, within 25 feet of his working place. It seems from the evidence collected, that Mr. Watson and a man by the name of Cox were employed to draw the entry pillars, and while either going into or coming out of the working place, the roof gave way and a ton or more of rock fell upon him ; he was taken out and sent to his home, but expired in two hours after the accident. W. P. Thomas, mining boss, testified under oath that he did not know that the rock was loose, and that he had instructions from the company to keep all roadways and other places where men had to travel securely timbered, which he tried to do.

J. M. Guffey, a miner who worked in a room near the place where the accident occurred, said under oath : " Mr. Watson was killed by fall of rock near the mouth of my room ; I did not know the rock was dangerous."

Mine 27, addition :

Coal is brought to the surface from two drifts ; the one to the left gave employment to about 50 men at date of inspection (May 14). Ventilated by a furnace, which was removing 6,280 cubic feet of air per minute. The drift to the right is also ventilated by a furnace, which was removing 6,480 cubic feet of air per minute, with about 50 miners employed ; the air in both these mines was being conducted around the workings as well as it is practicable in this kind of work (pillar and room) ; roof fair ; roadways good ; mine fairly well drained.

Mine operated by D. C. Davis :

Mine had been idle several months, having just started to work a few days before this inspection was made ; therefore only about 20 men were employed, but the mine was found to be well ventilated by a small furnace, and in good condition.

Mine operated by James O. Duncan :

This mine was first opened on the long-wall plan, but as it was hard to keep miners who understood this kind of work, it was thought best to change it to the pillar and room plan, which plan is now used ; a small furnace is used to ventilate the mine ; roadways are wet and muddy, on account of water leaking through the break in the roof caused by the long-wall work ; 12 men were employed.

The company was also opening two other mines on the property.

BEVIER.**Loomis & Snively Coal Co. :**

W. H. Loomis, general manager. This company own and operate three mines in the vicinity of Bevier, all of which are connected with the H. & St. Joe R. R. by switches. The coal is from 3½ to 5 feet thick, and worked on pillar and room plan. Pay for mining unscreened coal (or run of mine) 50 cents per ton in summer and 60 cents in winter ; most of the coal is mined and wedged by the miners, but little powder being used.

Mine No. 1—Shaft 60 feet deep ; steam plant ; this mine was inspected May 16 and June 3 ; I found an improvement in the ventilation—a new 10-foot fan having been put in to take the place of the furnace ; air measurements as follows : south side of shaft, 7,680 cubic feet per minute, and north side 6,300 cubic feet, total 13,980 cubic feet of air per minute, and only about 60 men employed ; the mine was found to be well drained, well ventilated and in good condition, with the exception of an additional escapement shaft, which I think should be located at such a distance south of the creek—which runs near the hoisting shaft—as to secure safety to the miners working in the mine in case the creek should break into it. No. 4 can be used as an escapement for the employes who work on the north side of hoisting shaft, but as the creek runs between the employes who work to the south of hoisting shaft and escapement shaft, it affords no escape to the employes in this part of the mine. I called the prosecuting attorney's attention to this fact, and he advised me to give the company notice to sink an escapement shaft within one year ; which I have done.

Mine No. 3—Steam plant ; shaft 72 feet ; ventilated by a 10-foot fan, which was removing 5,200 cubic feet of air per minute (unmeasurement was taken about 3,000 feet from fan) ; there were about 38 miners employed at date of inspection (May 20, 1889) ; roof is bad in many places, nothing but fire clay overlying the coal in some parts of the mine, while in other places the bottom is soft and the pillars, being too small, are sometimes driven down into the bottom by the weight of surface above, causing the roadways to heave. I was told by the mine superintendent,

Mr. Thomas Francis, that it was necessary to timber some of the roadways two and even three times during the year on account of the bottom heaving and breaking the timbers.

Mine No. 4—Steam power; shaft 52 feet deep; this mine was inspected twice during the year (on May 19 and June 3); it is ventilated by a 12-foot fan, which was removing 8,600 cubic feet of air per minute (the measurement on north side of fan was taken 1,000 feet from fan); this being inadequate, led to an investigation of the fan, which was found to be making only 65 revolutions per minute. The engineer was instructed to increase the fan to 80 or 90 revolutions per minute, which he did, making a great improvement in the air current. The escapement road into Watson's mine had been closed, the company was therefore notified to open it immediately or within ten days; on my second inspection the roadway was open and in good condition, as was also the mine. All of the coal in this mine is mined by machinery, with the exception of a few entry and room pillars, which are being drawn by hand mining. There were about 110 men employed in and about the mine.

Oakdale Coal Co.:

J. W. Atwill, president; S. S. Evans, Supt. Mine located at Bevier; connected with the H. & St. Joe R. R. by a switch; steam plant; shaft 60 feet deep. In May I made an inspection of this mine, and found the company had completed an escapement shaft in December, which is located in a very convenient place, but owing to the shaft in which the furnace was located falling in a few days before this inspection was made, the escapement shaft was being used as a ventilating shaft, using a basket of fire as motive power. This being inadequate, I so informed the superintendent, and requested him to increase the air current in mine in a reasonable length of time, and in due time a 10-foot fan was erected; therefore, I have no doubt that the mine is now well ventilated and in good condition. Coal is about 4 feet thick; worked on pillar and room plan; pay 50 cents in summer and 60 cents per ton in winter for unscreened coal. From 65 to 80 men are employed.

Thomas E. Wardell:

Owens and operates the three following mines, located near Bevier, all of which are connected with the H. & St. Joe R. R. by switches; coal is about 4 feet thick, worked pillar and room plan; pay for mining 50 cents per ton in summer and 60 cents in winter for unscreened coal:

Mine No. 1—Steam plant; ventilated by a 10-foot fan; shaft 140 feet deep; mine idle at date of inspection (May 17, 1889), and had been for several weeks.

Mine No. 3—Steam power; shaft 120 feet deep; ventilated by a 10-foot fan on the north side of shaft and a furnace on the south. The north side of mine was well ventilated, but as the air on south side had such a great distance to travel before reaching the miners it was found to be inadequate. I therefore notified the mining boss, Mr. Charles Cavanaugh, to clean out air course and also put a brattice cloth across entry to force the air up through the rooms in which the men were employed, and also make a roadway around the bottom of hoisting shaft to escapement. A few days after I again made an inspection and found Mr. Cavanaugh making the roadway in question; he had put the brattice cloth across entry as requested. The air measurement was 9,500 cubic feet on north side and 6,720 cubic feet per minute on south side. Mines give employment to from 115 to 125 men; machinery, roadways and drainage good.

Mine No. 4—New mine, opened by Harry Rubey & Co., the first coal being hoisted in January, 1889. In April the property was sold to Mr. Wardell, since which time

it has been operated by him. Machinery, tip-house, cages, safety-catches, etc., were in good condition; shaft is 115 feet deep; mine is worked double entry, pillar and room plan; the hoisting shaft is bratticed off into three compartments, two of which are used for cageways, the other for a ventilating or air shaft; they were depending on nature to ventilate the mine (date of inspection May 16, 1890); there was not a door nor brattice cloth in the mine to control the air, although some of the entries were driven over 100 yards from the bottom. In calling Mr. Wardell's attention to these facts, he said that he would have a steam jet put in to be used temporarily until an air shaft could be sunk. He also ordered doors to be hung in proper places to control the air.

June 5 I again made an inspection of the mine and found that the steam jet had been put in; they were also putting in doors, but I found that the boss had been making a practice of having rooms driven too far without making a break-through. I also called Mr. Wardell's attention to this fact and he assured me in a letter a few days afterward that these matters would be attended to at once, and as I have had no complaints from the miners since, I have no doubt that my requests have been complied with. Air and escapement shaft since completed.

Watson Coal Co. :

John Watson, superintendent; Wm. Rivers, mining boss. Mine located at Bevier; connected with the H. & St. Joe R.R. by a switch; steam plant; shaft 174 feet deep; ventilated by a 10-foot fan, which was removing 9,630 cubic feet of air per minute (measurement was taken 1,300 feet from fan); the air was being forced and circulated to all parts of the mine as well as it is practicable in this kind of work (pillar and room); roof, roadways and drainage good; coal is from 4 to 5 feet thick, worked pillar and room; pay 50 cents per ton for mining in summer, and 60 cents in winter for unscreened coal; about 70 men and boys were employed in and about the mine at date of inspection (May 16, 1890.)

LINGO.

Little Pittsburg Coal Co.:

Mr. E. Stuckey, superintendent; C. A. Parker, mining boss. Mine connected by a switch with the H. & St. Joe R.R.; machinery, safety catches, cages, etc. in fair condition; shaft 130 feet deep; ventilated by a 6-foot fan, which was giving poor results at date of inspection (June 4, 1890.) The miners are divided into two groups, one group on and to the right of main entry, the other group on an entry to left of main entry. There were some old works between these two groups of men, through which the air had to travel, therefore it was mixed with black damp in such large quantities before reaching the last group of miners that it was unfit to breathe, but the company was working to connect an airway direct from one group of employes to the other, which the superintendent assured me would soon be complete—which it was, according to the following letter from Mr. Stuckey:

LINGO, Mo., June 14, 1890.

Mr. C. C. WOODSON, State Mine Inspector, Jefferson City, Mo.:

DEAR SIR—Yours of June 6 is received, and in reply would say, have, since your inspection, made that opening talked of and cleaned up the air courses generally, which has made all the improvement in air required by you. Would invite your inspection again at any time you can do so.

Yours truly,

E. STUCKEY, Manager.

April 17, miners went on strike for 2 weeks' pay; after being out several days, the trouble was compromised by company withholding only 4 days of employes' wages on each pay-day; prior to the strike from 15 to 20 days' wages were withheld.

Roof overlying the coal is fairly good; mine extra dry; coal worked long-wall plan.

MACON CITY.

Hillyer & Sterritt Coal Co.:

Steam plant; located $1\frac{1}{2}$ miles west of Macon City; connected with the H. & St. Joe R. R. by switch; there are two seams of coal in this shaft, one at a depth of 178 feet, the other at a depth of 78 feet; the last named seam is the one which has been worked during the past year; this coal is about 2 feet thick; worked long-wall plan. Mine was idle at date of inspection (May 15), miners having gone on strike on 28th of March, because the company had neglected to pay them for work performed. On or about March 30, the miners went to the company store in a body and took the amount due them in goods.

During the year the company has completed an air and escapement shaft, also erected a 10-foot fan and put in a crusher and revolving screen, all of which are good improvements and in good condition.

MORGAN.

Rich Hill Lead and Zinc Co.:

Abandoned their mines in July, and moved the machinery to Galena, Kansas.

Samuel Martin:

Owns some coal land in the vicinity of Versailles; but little mining has been done upon the land during the past year; coal mined was used for home consumption.

MONTGOMERY.

Novall, H. B.:

Is operating a small mine near Wellsville; operated in fall and winter for home consumption.

Robert Ralston & Co.:

Slope; located 2 miles southwest of Wellsville; coal is about 30 inches thick; worked pillar and room plan; coal used for home consumption.

Henry Whitehead:

Mine located 1 mile south of Wellsville; is a shaft 40 feet deep; horse power; coal is about 30 inches thick; worked pillar and room plan; coal used for home consumption.

Vandalia Coal Co.:

Wm. Ralston, secretary. Mine located three-quarters of a mile west of Wellsville, connected with the Wabash railroad by a switch.

Steam plant; shaft 100 feet deep; mine inspected June 23, but was idle, the miners having gone home complaining that the air was bad. After making a careful examination of all parts of the mine, I found that the bad air was caused that morning by the fire having been neglected for two or three days before this inspection was made, during which time the mine had been idle. Coal is worked on the long-wall plan and is about 30 inches thick; pay for mining 86 cents per ton for clean coal.

This is a co-operative company, composed entirely of coal miners.

NEWTON.

Baker & Co.:

A. Baker, superintendent. Mine located 5 miles southwest of Joplin, on the Jackson land. This company has a lease on 100 acres of land, upon which these mines are located. At this date (July, 1890) there are only two mines in operation, one steam plant operated by Baker & Co., shaft 90 feet deep; steam power; 1 crusher, 1 set rolls and 1 steam pump are in use.

The other mine is sub-leased to King & Co., is a shaft 60 feet deep; horse power. There have been several mines in operation upon the land during the past year, but these are the only ones in operation at this date.

Granby Mining & Smelting Co.:

Mr. John Hingston, superintendent. Mines are located near Granby. Company does no mining, but lease the land in lots 200 feet square to operators, who put in machinery and work the mines, paying the company royalty.

Both lead and zinc are being mined. The lead is smelted at Granby, but the zinc is shipped to the company's smelting works at Pittsburg, Kan., to be smelted.

Company's dressing works at Granby consist of 2 crushers, 3 sets rolls and 9 sets steam jigs, which give employment to about 34 hands, including furnace hands.

In addition to the regular mines there are about 25 men employed prospecting.

For table showing operators and character of mines at date of inspection (July, 1890), see page 60.

Norton Mining Co.:

Wm. McCullough, superintendent. Mines located 3 miles south of Joplin. These mines were closed last October, lying idle all winter, but reopened in April, since which time they have been in operation; company drains the land, for which additional royalty is charged. At this date (July, 1890) only one mine is producing ore. It is operated by the company; shaft 90 feet deep; horse power; there are about 13 men prospecting upon the land.

Potwin mine:

C. A. Potwin, manager. Mine located near Seneca; mine was closed down July 1 in order to sink shaft to a greater depth: shaft is about 100 feet deep; steam power; when mine is in operation about 20 men are employed; there are also several men prospecting upon the land.

Roaring Springs Lands and Mining Co.:

T. C. Hood, superintendent. Mines located $4\frac{1}{2}$ miles southwest of Joplin; company lease land in lots 200 feet square to operators, who pay a royalty of 15 per cent on zinc and 20 per cent on lead; operators do their own pumping; there are 10 men prospecting upon the land in addition to the employes in the regular mines. For table showing operators and character of mines date of inspection (July, 1890), see page 61.

Mosley mine:

Not in operation.

Tanyard Hollow mines:

Are now idle and have been for several months.

PUTNAM.**MENDOTA.****Mendota Coal and Mining Co.:**

Mr. W. Ketchman, president; B. H. Johnson, superintendent. Company is operating two mines, both of which are connected with the C. B. & K. C. railroad by switch; coal is about 33 inches thick; both pillar and room and long-wall plans being used; pay for mining in summer $3\frac{1}{2}$ cents per hundred weight, and $4\frac{1}{2}$ cents per hundred weight for unscreened coal in winter. The coal is consumed in Missouri, Kansas, Iowa, Nebraska, Minnesota and Dakota.

Mine-No. 1 is a drift; ventilated by two furnaces, which were removing 25,200 cubic feet of air per minute, which was being forced and circulated to all parts of the mine; both hand mining and machinery are used in this mine; there are 8 Harrison mining machines now in use; run by compressed air; mine gives employment to from 150 to 250 men and boys.

The coal is brought to the surface by machinery, a wire rope being used, which seems to be giving satisfaction.

Mine No 4 is a slope; ventilated by a furnace, but as the mine was not in operation at date of inspection (March 18, 1890), I could not take measurements of air. This mine is usually idle in summer on account of small demand for coal, but in fall and winter it gives employment to from 75 to 115 men and boys.

UNIONVILLE.**Chadwick, O.:**

Mine located 7 miles southeast of Unionville. Coal is used for local consumption.

Corder, D. M. S.:

Is operating a mine 3 miles north of Unionville. Shaft 25 feet deep; horse power; coal is about 3 feet thick; worked pillar and room plan; employs from 2 to 6 men.

De Garmo, G.:

Mine located 7 miles southeast of Unionville. Shaft 38 feet deep; horse power; coal 3 feet thick; worked pillar and room plan; employs from 3 to 6 miners; coal used for home consumption.

Viles, W. R.:

Drift, located 5 miles southeast of Unionville. Coal 3 feet thick; worked pillar and room plan.

RANDOLPH.**ELLIOTT.****Osage Coal & Mining Co.:**

Mr. J. C. Fleming, superintendent. Mine located at Elliott; connected with the M., K. & T. R. R. by a switch; is a steam plant; shaft 145 feet deep; ventilated by a 6-foot Murphy fan, which was removing 16,800 cubic feet of air per minute at date of inspection (May 5, 1890); coal is about 4 feet thick; worked long-wall plan; pay for mining 94 cents per ton for clean coal; mine and machinery in good condition; employ from 80 to 110 men and boys in and about the mine.

July 1, 1890, company cut the price of mining from 94 to 80 cents per ton; miners went on strike against the reduction and are out at this date, September 16, 1890.

HIGBEE.

Higbee Coal & Mining Co.:

Mr. Wm. Walton, superintendent. Mine is connected with the C. & A. R. R. by a switch. Steam plant; shaft 170 feet deep; ventilated by a 10-foot fan, which was removing about 6,000 cubic feet of air per minute; this being inadequate, an examination was made of the fan, it was found to be making only about 70 revolutions per minute. On increasing the fan to 103 revolutions per minute, the anemometer registered 9,680 cubic feet per minute; the engineer was instructed to keep the fan going at this speed at all times. The manner of mining has been changed during the past year from pillar and room plan to the long-wall, which is giving better satisfaction.

Miners went on strike June, 1889, caused by reduction of wages, but there were a few men who continued to work during the strike. After the strike was declared off, and the men returned to work, there were a few of the strikers that would not ride on cage with the men that did not go on strike, which caused the mine boss to discharge one of them. This caused another strike, which lasted two months. Miners declared strike off September 1, and returned to work without the discharged man being reinstated.

Coal is about 3 feet 8 inches thick; employs about 100 hands in and about mine.

Interstate Mining Co.:

Mr. John S. Elliott, president, and William Walton, superintendent. Mine located 1 mile south of Higbee; connected with the M., K. & T. by a switch.

New mine, put into operation during the past year, equipped with good machinery; shaft 110 feet deep; ventilated by a 12-foot fan, which was removing 8,900 cubic feet of air per minute, which was being forced and circulated to all parts of the mine. Coal is about 40 inches thick; worked long-wall plan. By this method of mining but little powder is used. It is sometimes necessary, however, to use a small shot when the weight is not sufficient to break the coal down after it is mined. There were about 90 men and boys employed in and about the mine at date of inspection, May 3, 1890.

HUNTSVILLE.

John Breckenridge:

Mine No. 2½—Located 1½ miles east of Huntsville; connected with the Wabash railroad by a switch. This mine was bought by Mr. Breckenridge May 3, 1890, who put men to work at once to clean up entries, air courses, etc. Shaft 98 feet deep.

Mine No. 3½—Connected with Wabash railroad by a switch. Mine was inspected May 8, 29 and 30. On first inspection it was found that the company had allowed the escapement road to fall in. The company was therefore notified to clean out the escapement road within a reasonable length of time. The second inspection was made on the 29th, and roadway in question was found to be nearly complete.

A measurement of air was taken, which was 5,800 cubic feet per minute, which was inadequate. On examining the air course it was found to be too small in many places. I immediately notified Mr. Breckenridge of the condition of the air course and suggested that he go through the mine with me the next day, which he did.

We took several measurements of the air, the average quantity being 4,963 cubic feet per minute. After going through all parts of the mine and seeing the condition of the air course, Mr. Breckenridge gave orders for it to be cleaned out immediately, at the same time assuring me that the work would be completed as soon as possible, and as I have had no complaint from the employes of this mine, I have no doubt that the work has been completed. Coal is about $3\frac{1}{2}$ feet thick; worked on the pillar and room plan. May 15th company cut the price of mining from 60 cents per ton to 50, which caused a strike of four days, after which the miners accepted the reduction. From 70 to 90 men and boys are employed. Mr. Breckenridge has also bought and is now operating the Evans & Co. mine, which employs 5 or 6 miners.

Buckhardt Mine No. 2:

Operated by Mitchell & Co.; drift; employs from 2 to 4 men; coal is about 4 feet thick; worked pillar and room.

Eureka Coal Co.:

John Jack, mine superintendent; drift; ventilated by a furnace, which was giving good results; mine fairly well drained and in good condition; coal about 4 feet thick; worked on pillar and room plan; employing 9 hands; date of inspection May 9, 1890.

Jones, G. W.:

Is operating a mine near Huntsville; employs from 2 to 7 men.

Huntsville Coal & M. Co.:

H. L. Rutherford, superintendent; M. B. McHugh, mining boss. Mine located 3 miles east of Huntsville; connected with the Wabash railroad by a switch; is a shaft 88 feet deep; steam power; ventilated by a 10-foot fan.

Mine was inspected May 30; 6 or 7 men were employed, making a new entry to some new work and to clean up air courses, etc., the mine having closed down May 15. This mine, when in full operation, employs from 50 to 80 men.

Rogers, J.:

Mine located near Huntsville; drift; employs 1 to 5 men.

Woodward Coal Co.:

Operated by Miss M. E. Garvey; mine connected with the Wabash railroad by a switch; steam plant; shaft 75 feet deep; ventilated by a 10-foot fan, which was making 90 revolutions per minute, and only removing 6,000 cubic feet of air per minute. This was caused by the air-courses being too small in places. April 18 miners quit work on account of not having timbers to secure their working places. May 1 the mine changed superintendents; the new superintendent wanted to open the work on a different plan from that in use, and he wanted to take the loose coal in the miners' rooms, as he said, to pay for cleaning them up; this was refused by the miners, who said it was not their fault that the rooms had fallen in, and they did not think it just for the company to take the coal they had mined without paying them for it. I understand that the mine has not been started up since; mine was inspected May 7, 1890.

MOBERLY.

Brennan, Wm.:

Owens and is operating a mine located $3\frac{1}{2}$ miles northwest of Moberly; drift; coal about $3\frac{1}{2}$ feet thick; worked pillar and room plan.

Devors & Co.:

Operating a mine $3\frac{1}{2}$ miles northwest of Moberly; drift; employing 3 to 5 hands; coal worked pillar and room plan.

Klingman, J. F.:

Is operating a mine $3\frac{1}{2}$ miles northwest of Moberly; drift; employs from 3 to 8 miners.

McKernan, Joseph:

Mine located 3 miles northwest of Moberly; coal about 3 feet, 8 inches thick; worked pillar and room plan; ventilated by a furnace; employs from 3 to 8 men.

Perkins Bros.:

Mine located 2 miles Northwest of Moberly; shaft 106 feet deep; horse power; ventilated by a furnace; coal is about $3\frac{1}{2}$ feet thick; work on pillar and room plan; employs from 4 to 10 men; mine in fair condition; date of inspection May 10. I understand this mine is now operated by the Moberly Mutual Coal Co.

Shaw, J. C.:

Mine located 3 miles northwest of Moberly; drift; coal about 46 inches thick; worked on pillar and room plan.

Ward, Harry:

Shaft 88 feet deep; horse power; ventilated by a small furnace; employs from 6 to 10 men.

Williams, John:

Shaft 96 feet deep; horse power; mine idle at date of inspection (May 10)

RENICK.**Kansas & Texas Coal Co.:**

Tom Fleming, general manager; George Morris, mining boss. Steam plant; connected with the Wabash R. R. by switch; shaft 110 feet deep; machinery, safety catches and ropes in good condition, but neither of the cages was covered, nor were there any gates around the west cageway.

This company leased the property from the Renick Coal & M. Co., August, 1889. Prior to that time the mine had been worked on pillar and room plan, but when this company took charge they changed it to long-wall, which was not giving satisfaction, owing to the soft nature of the roof, which would sometimes break and fall along the face of the coal, thereby obstructing the air course; mine ventilated by a small furnace which was only removing about 2 000 cubic feet of air per minute at date of inspection (May 6); this deficiency was caused by small places in air course.

The superintendent claimed that the air shaft, in which the furnace was located, was also an escapement shaft; as I did not think so, I therefore gave the company notice to put in an escapement shaft at once, or within a reasonable length of time, or to erect a fan to take the place of the furnace, which would insure safety to the miners in case of an accident to the main hoisting shaft.

May 31 I again made an inspection of the mine to satisfy myself as to whether they had complied with the law, and found they had covered cages and also put gates around west cageway, but had made no effort toward making an escapement shaft. I therefore filed a complaint with the prosecuting attorney of Randolph county against the company for violating the law.

June 9 the mine was closed down. I was notified of the fact, and asked to withdraw the charges against the company, which I did, because the closing of the mine rendered further prosecution unnecessary.

THOMAS HILL.

Joseph Milburn & Son :

Horse power; shaft 50 feet deep; ventilated by a furnace; employ 4 to 6 men; coal about 4½ feet thick; worked on pillar and room plan; coal used for home consumption.

BALLS.

There are several small coal mines and strip pits or quarries being operated in this county for home consumption. Among those who are operating mines are H. B. Bell and John Russell, Perry postoffice; also Jas. Calor, Hutchison postoffice. Coal is about 26 to 30 inches in thickness.

RAY.

CAMDEN.

Bovard-Brown Coal Co. :

John D. King, superintendent. Steam plant; shaft 40 feet deep; ventilated by a furnace, which was giving fair results. New mine; the company had not yet put cover over cages nor gates around the top of the shaft; with this exception the mine and machinery were found to be in fair condition. Coal about 18 inches thick; worked on the long-wall plan; mine gave employment to 35 men; date of inspection April, 8.

FLEMING.

Kansas and Texas Coal Co. :

John R. Braidwood, superintendent; Tom Graham, mine boss; steam plant; shaft 70 feet deep; mine was bought from the Scullin Coal Co. last August, 1889. I visited and made a careful examination of all parts of the mine April 7, and found the furnace was not producing the amount of air required to properly ventilate the mine, neither had they any escapement shaft. I therefore notified the superintendent that the law required an escapement shaft in all mines employing 10 or more men, and in due time the company erected a 12-foot fan to take the place of the furnace; therefore the fan shaft is used as an escapement shaft. Coal is from 18 to 22 inches thick; worked on the long-wall plan; mine employs from 80 to 100 men and boys.

RICHMOND.

Black Diamond mine :

Operated by Wm. Pence. Shaft 75 feet deep; employs from 2 to 4; coal used for home consumption.

Ford, J. T. :

Mine located 1½ mile east of Richmond; is a slope; horse power; mine not in operation at date of inspection, April 5.

Hubbell Coal Co. :

John Hubbell, superintendent; steam power; shaft 100 feet deep. This property was bought from Wm. Wilson in April, 1890, since which time this company has been operating it; ventilated by a furnace which was removing 3,600 cubic feet

of air per minute; machinery for hoisting, etc., in good condition; mine well drained and in good condition; coal about 22 inches thick; worked on the long-wall plan.

Hubbell, Hyatt & Hubbell Coal Co.:

John Hubbell, superintendent; John McCart, mine superintendent; steam plant; shaft 112 feet deep; ventilated by a furnace which was removing 7,000 cubic feet of air per minute; the air was being forced and circulated to all parts of the mine. This is an unusually dry mine; I understand that there never was a pump in it, and it does not furnish enough water to sprinkle the roads. Coal is about 2 feet thick; worked on the long-wall plan; mine and machinery in good condition.

Hughes & James:

Mine located $2\frac{1}{2}$ miles northeast of Richmond; is a shaft 35 feet deep; horse power; ventilated by a furnace; coal is about 2 feet thick; worked on long-wall plan.

Martin Coal Co.:

W. H. Darneal, superintendent; mine is connected with the Santa Fe R. R. by a switch; horse power; shaft 100 feet deep; ventilated by a furnace which was removing 2,400 cubic feet of air per minute, with about 30 miners employed. This mine is comparatively new, having been in operation a little over a year; therefore it is not very extensive; I found the mine in fair condition with the exception of an escapement shaft, which the law requires; the company was therefore notified to make the escapement (or second opening), which they did; coal is about 22 inches thick; worked long-wall plan.

Mosby & Allison:

Mine located 1 mile east of Richmond; shaft 60 feet deep; horse power; employs from 3 to 9 men; coal is about 2 feet thick; worked on the long-wall plan.

Pickering & Co.:

Opening a mine 1 mile north of Richmond; connected with the Santa Fe R. R. by a switch; shaft is 93 feet deep; machinery was being put in place at date of inspection, March 27, 1890; commenced to hoist coal May 5.

Rankin & Co.:

F. A. Rankin, superintendent. Mine located $1\frac{1}{2}$ miles northwest of Lexington Junction, on Santa Fe R. R.; ventilated by a furnace; coal is about 24 inches thick, worked on the long-wall plan; it is brought to the surface through a drift which is high enough above the railroad track to give room for tip-house, etc. Mine was inspected April 3 and found to be well ventilated and in good condition.

Richmond Coal Co.:

John Gibson, superintendent. This company is operating seven mines in this county, located along the lines of the Santa Fe and Wabash railroads, all of which are shafts; coal is from 18 to 24 inches thick, worked on the long-wall plan; pay 4 cents per bushel for mining.

Mine No. 1—Steam plant; shaft 55 feet deep; ventilated by a furnace, which was giving good results at date of inspection (April 8). This mine is connected with No. 2, therefore one affords an escapement for the other. Mine and machinery in fair condition.

Mine No. 2—Steam plant, located about 400 feet east of No. 1; shaft 57 feet deep; ventilated by a furnace, which was giving fair results; mine and machinery in fair condition.

Mine No. 3—Steam power; shaft 50 feet deep; ventilated by a furnace which was removing 5,500 cubic feet of air per minute, with about 100 miners employed. There was a wet and muddy place along the face of coal and on first south entry on east side of hoisting shaft, through which the miners in that part of the mine had to pass. The company was notified of the fact and requested to have it drained and put into a healthy condition. Mine was inspected April 3.

Mine No. 4—Mine inspected April 3. Located about 2 miles south of Richmond, and within $\frac{1}{4}$ of a mile of No. 3; steam plant; shaft 75 feet deep; ventilated by a furnace which was removing only 3,570 cubic feet of air per minute; a part of the mine was found to be in fair condition, while other parts of it were found to be poorly drained; air was poor in several parts of the mine; this was caused by the furnace not being sufficient.

Mine No. 5—Was inspected March 28. Steam power, adjoining No. 4; shaft 75 feet deep; machinery for hoisting in fair condition; mine is ventilated by furnace, which, like furnaces at Nos. 3 and 4, is not large enough; only 4,000 cubic feet per minute was passing through the mine, in which from 65 to 75 men and boys are employed; I therefore notified the company's superintendent of the deficiency of air in mines Nos. 3, 4 and 5, and requested him to increase the air current to the amount required by law. After giving this notice and being assured by the assistant superintendent, Mr. Gibson, that the air current would be increased at once by increasing the size of the furnaces and looking after the fires in same more carefully, I felt assured there would be no further trouble in regard to the air.

July 25 I received a letter from Richmond, with several of this company's employees' names attached, stating that the air was bad in all of these mines, and requesting me to come and make an examination at once. As it was impossible for me to make an inspection just at that time, I notified the company of the fact, and requested them to increase the amount of air in mine to 100 cubic feet per man per minute within fifteen days, under penalty of the law, and have since received notice from the miners that the company has made improvement in the air, and that the miners are contented.

Mine No. 9 is a shaft 97 feet deep; located near Richmond, but has not been in operation during the year.

SWANWICK.

Williams Coal Co.:

Horse power; shaft 95 feet deep; mine was inspected April 5, and found to be in fair condition; coal from 18 to 20 inches thick; worked on the long-wall plan, but the coal is obstructed by clay seams, falls, etc.; pay 4 cents per bushel for mining. Miners were on strike, having struck against the weigh boss April 4, but returned to work May 7 without the weighman being dismissed.

SALINE.

SLATER.

Aner, M.:

Drift; located $4\frac{1}{2}$ miles southeast of Slater; coal about 18 inches thick; worked on pillar and room plan.

Copland, John B.:

Mine located $2\frac{1}{2}$ miles southeast of Slater; drift; coal from 17 to 20 inches thick; worked on pillar and room plan; employs from 2 to 6 miners; coal is used for home consumption.

Hayner, J. R.:

Drift; located 4 miles southeast of Slater. Mine worked in fall and winter for home consumption; coal about 20 inches thick; worked on the pillar and room plan.

Tennill, J. M.:

Mine located 4 miles southeast of Slater. Drift; coal about 20 to 24 inches thick. Mine worked in fall and winter for local trade; worked on pillar and room.

There are also several small mines in the vicinity of Slater which are worked by farmers and local operators for home consumption.

Wilburn Coal Co.:

Mine located 2 miles north of Napton. Mr. H. J. Stewart, of Marshall, superintendent. This mine was opened and worked by a slope until February 25, at which time the slack that had been left in the mine took fire, which caused the company to abandon the mine and allow it to fill with water. Since then they have sunk a shaft which is 75 feet deep; horse power. This is a soft bituminous coal, and seems to be a pocket. It is said to be 15 feet thick in places; from 4 to 8 men are employed; coal used for local consumption.

SCHUYLER.**COATSVILLE.****James, W. F.:**

Is operating a mine near Coatsville for local consumption. Drift; employ from 3 to 8 miners; coal about 3½ feet thick; worked on pillar and room plan.

ST. FRANCOIS.**DOE RUN.****Doe Run Lead Co.:**

J. W. Jones, president, F. P. Graves, superintendent.

This is an excellent plant, erected three years ago, at a cost of about \$125,000. The ore is brought to the surface through a vertical shaft 108 feet deep by machinery. It is disseminated in magnesian limestone, and said to contain about 6 or 7 per cent lead. The ore-bearing stratum is sometimes found to be 30 feet in thickness, and is overlaid with a limestone rock several feet thick. Underground work is divided into three eight-hour shifts, for which the employes receive from \$1.10 to \$2.00 per shift. The mine was inspected February 6, and found to be well drained and fairly well ventilated.

The dressing works consist of 4 crushers, 4 sets rolls and 24 sets jigs, which are run by a 200-horse power engine.

There are about 135 miners and mine laborers, and 150 other employes in and about the dressing works, mine and furnaces.

IRON MOUNTAIN.**Iron Mountain Co.:**

Charles C. Maffitt, president, and Charles A. Pilley, superintendent. The company owns over 30,000 acres of land, lying in this and adjoining counties. The mines were opened in 1845, since which time they have been in operation. The ore is found in fissures, varying from a few feet to 60 feet in thickness, and dips at an angle of from 10 to 90 degrees, and is said to run from 43 to 67 per cent metallic iron. In some places the ore is worked by open quarries, while in other places it is found two or three hundred feet below the surface. There are about 174 miners

and 127 other employes at work in and about the different mines: Wages range from \$1.15 to \$1.80 per day, and are paid in cash every 2 weeks. The superintendent said to me: "By paying our men every two weeks we get the best class of laborers, and can keep them, therefore we find it an advantage."

Mine No. 1—Is a steam plant; shaft 216 feet deep; about 130 feet from the bottom of hoisting shaft the gangway or entry turns to the left, and is driven 690 feet at a dip of 14 degrees. A hoisting engine is located at top of the incline plane to hoist the ore. I made a thorough examination of the mine and found it in good condition.

Slope No. 1—Is a steam plant. The slope is about 290 feet long, dipping at an angle of about 25 degrees. This mine was also found in good condition.

Shaft No. 2—Is 269 feet deep; machinery, safety catches, cages, etc., in good condition. Ore in this mine dips to the southeast, and has been followed from the surface on one side of the shaft to this depth, therefore worked by open quarry, but the ore is hoisted out through the shaft.

Slope No. 2—Steam plant. The roof over the ore in this mine is poor (on account of ore lying near the surface), but it is well timbered. These mines were inspected February 4 and 5, and found to be in good condition.

BONNE TERRE.

St. Joe Lead Co.:

J. Wyman Jones, president; Mr. C. B. Parsons, general superintendent; Capt. Tom Porter, mine superintendent.

This is probably the largest establishment of its kind in the United States. The ore is brought to the surface through a vertical shaft 250 feet deep. Machinery for hoisting was in good condition, but no one was allowed to go up or down on cages. The company had a good stairway built in a shaft sunk for that purpose, through which the employes had to pass in going to and from their work. After making a thorough examination of the mine, I found that the company had a powder magazine in an old abandoned part of the mine. I was told by one of the mine bosses that there were sometimes from 400 to 600 boxes of dynamite (and as each box weighs 50 pounds this would be 30,000 pounds) kept in this mine. It is true, the magazine was several hundred feet from the workmen, and I have no doubt but that all the precaution was used by the company that could be under the circumstances to avoid an accident, but as I did not think a man-trap of this kind should be kept in the mine, I notified the company to remove it, and in due time they notified me that my request had been complied with. With this exception, I found the mine in good condition. The ore is disseminated in magnesian limestone, overlaid with a good roof. Company's dressing works consist of 12 crushers, 12 sets rolls, and a great number and variety of jigs. The machinery is run by three large engines; however, only two of them are used at one time, the other being kept for use in case of an accident to one of the others. The mine gives employment to 80 miners, 275 other employes and 22 mules. Inspection was made February 10, 1890.

VERNON.

CARBON CENTRE.

Allen, R. E.:

Slope; located near Carbon Centre. Mine was idle at date of inspection, March 1, 1890. The mine is an old one and is about worked out.

Hurst & Griffith :

Slope ; located 1 mile south of Carbon Centre ; coal is about 4 feet thick, worked on the pillar and room plan ; employs from 6 to 12 men.

Mine was inspected March 1 and found to be in fair condition with the exception of drainage, which was poor.

I understand that the mine is now idle.

Hoss, G. S.:

Is having some mining done at Carbon Centre, but principally by "stripping ;" he is, however, operating one drift ; employs 40 to 50 hands. There are two seams of coal being worked, separated by from 4 to 5 feet of fire-clay. The top seam is from 18 to 24 inches thick ; the bottom seam is 4 feet thick.

MOUNDVILLE.**Hill, W. L. :**

Mine located near Moundville ; shaft 30 feet deep ; horse power ; ventilated by a small furnace ; coal is about 30 inches thick ; worked on the pillar and room plan ; employ from 5 to 16 hands in and about the mine.

Robinson, W. D. :

Owens and operates in fall and winter a mine for home consumption ; slope ; coal about 26 inches thick.

There are also a number of strip-pits, or quarries, and small local mines being operated in different parts of the county for home consumption ; a few of the principal operators are J. M. Harrison and McComb Bro's & Co. ; mines at Bedford ; postoffice Rich Hill, Bates Co. ; David Burdick and S. Allen, postoffice Bellamy ; Wm. Cargill and W. G. Gonterman, postoffice Sheldon.

WASHINGTON.**CADET.****Shibboleth Lead Mining Co. :**

The ore is worked by individual operators and is found from 5 to 50 feet below the surface. The lead ore is smelted by company before shipping.

FERTILE.**Higginbotham, Z. T. :**

The ore is found from 5 to 70 feet below the surface ; it is worked by individual mine operators, who pay the land owner a royalty on all ore mined. Mr. Higginbotham also owns a smelting furnace, therefore all of the lead ore is smelted by him before shipping.

OLD MINE.**Union Mining and Smelting Co. :**

John O. Long, superintendent. This company owns about 6,000 acres of land lying in the county, upon which these mines are located. They do no mining, but lease the land to miners, who pay the company a royalty of from 15 to 20 per cent on all ore mined. The ore is generally found near the surface, but a few shafts have been sunk to a depth of 150 feet. From 75 to 80 men and boys are employed upon the land. The company is also operating a smelting furnace at Old Mine.

White, Mrs. L. J. :

Land operated by J. E. Lowry, who is also operating a furnace. The ore is worked by individual operators, and is found near the surface ; from 30 to 50 men and boys are usually employed.

PALMER.**Palmer Lead Co.:**

A. Harris, superintendent. This company owns about 6,000 acres of mineral land lying in this and Crawford counties. The ore is found from the grass roots to a depth of 150 feet, this being about as deep as the ground has ever been prospected. At date of inspection (February, 1890) there were about 50 men at work; some of them were employed by the company, while others were working mines leased from the company and paying a royalty on all ores mined.

Wages of miners are only \$1 per day. Company also own and operate a furnace for smelting the ore.

POTOSI.**James Long:**

Owns several hundred acres of land lying in the vicinity of Potosi, upon which several small mines are located. The ore is usually found near the surface. There is a large amount of barytes or "tiff" mined, all of which is shipped to St. Louis. There were 12 or 15 men and boys at work upon the land at date of inspection, February, 1890.

Alex. McArthur & Bro. Lead Co:

This company has recently bought some 8,000 acres of mineral land in the vicinity of Potosi.

Both lead and barytes are being mined. The lead ore is smelted at the mines before shipping, but the barytes is shipped to St. Louis to be refined. Lead ore is found from the grass roots to a depth of 100 feet, and is worked by individuals who pay the land company a royalty on all ores mined. The following parties were operating mines upon the land at date of inspection, February, 1890:

B. Evans:

Shaft 47 feet deep; hand power; mine poorly ventilated. This was caused by having no return for the air.

McIntyre & Co.:

Shaft 40 feet deep; horse power; mine well drained and in fair condition.

McKinnon & Co.:

Shaft 25 feet deep; hand power; mine in fair condition.

RICHWOOD.**Charles Stockings:**

Is operating the Moran tract of land. He is also running a smelting furnace in connection with the mines. From 12 to 15 men and boys are employed.

J. & M. M. Flynn:

Are operating a furnace in connection with their mines; therefore ore is smelted before shipping. Company does no mining, but gives miners who wish to mine a permit to mine upon the land, and pay them for all ores mined in proportion to the value of the lead in St. Louis.

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